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# A Post-Graduate Lecture
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# PLEURAL EFFUSION.

*Delivered at the Manchester Royal Infirmary*

BY ALBERT RAMSBOTTOM, *M.C.*, M.D. MANC., F.R.C.P. LOND.,
PROFESSOR OF CLINICAL MEDICINE, VICTORIA UNIVERSITY, MANCHESTER; HON. PHYSICIAN, MANCHESTER ROYAL INFIRMARY.

THE frequency with which pleural effusion is met with, rather than the fact that I have anything new to bring before you, is the reason that I have chosen to say a few words about the condition to-day. It is impossible in one short lecture to deal at all fully with the various aspects of the condition, and therefore I propose to touch only upon a few points concerning diagnosis and treatment. First, an explanation of those physical signs common to cases of effusion, irrespective of the kind, into the pleural cavity; secondly, discussion of those signs which will assist us in determining the nature of the effusion; and lastly, a reference to the treatment of pleurisy with effusion.

## PRINCIPAL SIGNS OF EFFUSION.

The principal signs denoting the presence of effusion into a pleural cavity are, as we all know: (1) Displacement of the apex beat of the heart; (2) absolute dullness on percussion; (3) annulled vocal fremitus; (4) diminished or absent breath-sounds.

### *Displacement of Apex Beat.*

Normally the heart is kept in the median position by the lateral traction of the lungs acting equally and in opposite directions. When effusion occurs into one pleural cavity the lung on the same side collapses to accommodate that fluid. How readily a lung will collapse to accommodate fluid is shown by the rarity of bulging of the chest in pleural effusion. The result is that the lateral traction exerted by this partially collapsed lung will be diminished; thus the heart will be displaced towards the sound side, by being dragged over by the traction of the sound lung. This is what happens with moderate pleural effusion. This displacement is best seen in cases of left-sided effusion, because in its normal position the heart lies obliquely, the base being approximately in the middle line, while the apical portion points downwards, forwards, and to the left. The basal portion is fixed by the great vessels, so that when one speaks of displacement of the heart due to pleural effusion, one really means displacement of the apical portion, particularly the apex itself. This movement of the apex must, then, be of a pendulum character—swinging, as it were, upon the fixed base—and from its anatomical position the amplitude of this movement must obviously be greater towards the right. In cases where the effusion into the pleural cavity is considerable, sufficient to produce the signs of positive intrathoracic pressure, the apex beat is further displaced by the apical portion of the heart being actually pushed over to the sound side by the effusion. Thus it will be seen that the forces displacing the apex beat differ in cases of moderate pleural effusion from those of cases where effusion is large. In the former the apex is dragged over by the lateral traction of the sound lung, whereas in the latter there is the additional factor of being pushed over to the sound side by the pressure of the effusion.

### *Dullness on Percussion.*

Of this I have little to say. It has only to be heard, and may I say "felt," to be appreciated, for no dullness elicited over any other chest condition is so absolute, and no pulmonary affection imparts such a sense of resistance to the pleximeter finger; however noisy the room, one can make out the dullness. It has a convex upper extremity, called Damoiseau's curve, which has its highest point laterally and does not alter in shape with altered positions of the patient, unless the case is complicated by pneumothorax.

### *Annulled Vocal Fremitus.*

A few experiments undertaken with the help of my colleague, Prof. A. V. Hill, go to show that the vibrations of vocal fremitus are oscillations originating in the vocal cords and transmitted to the chest wall; they are not independent vibrations of the chest wall in its own period, excited by vibrations of the vocal cords. The absence of vocal fremitus over pleural effusion is common knowledge, but its explanation is not so apparent. I do not think it is sufficient to say that it is because fluid is a bad conductor of vibrations of sound, for we know that fluid is capable of conducting sound vibrations well. Sounds produced by submerged submarines are conducted well through the water, and sounds of explosions under water have been collected 150 miles away from their point of origin. Again, if you lie in a bath with the tap running and your head immersed in the water, you hear the sounds produced by the impact of the water falling from the tap into the bath exceedingly well, much better than when you raise the head out of the water. Further, if you fill a binaural stethoscope with water, apply the ear-pieces to your ears, and tap or rub the rubber tubing, you hear a loud noise. On the other hand, a stethoscope so filled with water will not pick up and conduct the sound emitted into air from a vibrating tuning-fork, nor will water in a bowl conduct the vibrations of a tuning-fork set into motion with the end dipped into the water.

There are apparently two factors involved. First, the passage of sound from air to water is difficult; water, because of its much greater density, tends to reflect, instead of to absorb, the energy of sound waves impinging on it from air. If sound once gets into water it will be transmitted. Secondly, not all vibrations can be transmitted by water. Water, having no rigidity, can conduct only compressional vibrations—changes of volume similar to a sound wave in air; the vibrations of the body wall felt in vocal fremitus are probably not of this type, but are rather torsional vibrations, changes of form depending upon elasticity, similar to a transverse wave travelling along a steel spring. These are not conducted by a fluid, which simply damps them down, and in consequence they are not felt by the hand applied to the chest wall.

We may suppose that in health sound waves, originating in the vocal cords, travel down the air passages into the lungs, are picked up by the light elastic tissue of the alveoli, and are transmitted directly to the elastic body wall. If a fluid lies between the pleura, then (*a*) there is a tendency to reflect, instead of to absorb, the vibrations, and (*b*) the elastic vibrations, which are the main part of the whole, cannot be transmitted at all. The latter point is emphasised by the fact that so long as there is any rigid connexion between the lungs and the body wall vocal fremitus may be retained; in cases of pleural effusion with some fibrous adhesions running between the two layers of the pleura, vocal fremitus is sometimes retained, for the solid adhesions are capable of conducting vibrations from the lung to the chest wall.

### *Absent Breath-sounds.*

The absence of breath-sounds over pleural effusion is due partly to the fact that the lung alveoli are partially compressed, the production of vesicular breathing being thus hindered, and partly to the interposition between the lung and chest wall of a layer of fluid which is almost incapable of transmitting the vibrations. In some cases of pleural effusion, of an amount sufficient completely to compress the lung, bronchial breathing is heard, but it is usually faint or distant, because of poor transmission of the vibrations by the interposing fluid. This type of breathing is not at all uncommon in children with pleural effusion—a fact which is very important to bear in mind, otherwise one may be misled into overlooking an empyema.

*Subsidiary Signs.*

In the presence of the above signs one can, I think, in the vast majority of cases, conclude that the case is one of pleural effusion, but, should there still be doubt, one can always resort to the exploratory needle, though very rarely should this be needed except as confirmatory evidence of the presence of fluid. Its chief value is to determine the nature of the effusion. I do not therefore propose to discuss the subsidiary signs of pleural effusion, such as Grocco's sign—which, in my experience, is frequently absent—ægophony, skodaic resonance, &c. I should however, like to refer to the shape of the chest in cases of pleural effusion, which as a rule is not altered, for as quickly as fluid is poured out the lung collapses to accommodate the fluid; sometimes the lung collapses to a degree greater than is necessary, in which case—as pointed out by Sir William Hale-White [1]—the affected side is actually smaller than the sound side. The only cases in which the affected side is enlarged is where the fluid is present in an amount large enough to produce the signs of positive intrathoracic pressure.

NATURE OF THE FLUID.

Having determined that fluid is present in a pleural cavity, it is essential next to determine its nature, for upon this the treatment will depend. If it is pus, immediate surgical interference is demanded for its evacuation; if it is serous, more conservative measures are employed, with a view to promoting absorption. Purulent effusions are, I believe, purulent from the beginning, whilst serous effusions do not tend to become purulent.

In empyema we know that it is the rule to have greater remissions in the temperature, night-sweats, and other septic phenomena, &c., which in conjunction with the appearance of the patient and the history of the case enable us in many cases to form a correct diagnosis; and in this connexion I attach a good deal of value to a point mentioned by Hale-White in the paper referred to above—namely, local tenderness of the chest wall as indicative of the fluid being pus. Firm but gentle pressure over the dull area in a case of empyema usually elicits tenderness sufficient to make the patient wince or call out; I can recall several cases in which the presence of this sign has been of the greatest value to me in deciding that an effusion was purulent, and encouraging me, in spite of several failures to find fluid, to persevere with the exploratory needle until I have found pus. But though this be the case, it is safe to say that there are no physical signs pathognomonic of pus, and therefore in a large number of cases it is impossible to form a correct idea of the nature of the fluid without employing the exploratory needle. Of course, as stated by Powell and Hartley,[2] evident pointing with fluctuation is a certain sign of the presence of pus, but as these authors point out, this is a late sign, rarely seen with modern methods of treatment. Œdema of the chest wall over a pleural effusion is always very strong evidence of empyema, though Dr. Graham Steell had under his charge at the Manchester Royal Infirmary a case of serous pleural effusion with definite œdema of the chest wall. In the diagnosis of empyema the physical signs and symptoms may be closely simulated by perinephritic abscess and by pyonephrosis. In both these conditions the general symptoms are those of sepsis; the collection of pus either around or in the kidney may be so great as to push up the diaphragm sufficiently to compress the base of the lung, so that a dull note on percussion may be yielded as high as the sixth rib, and over the dull area there is, of course, complete absence of breath-sounds, vocal fremitus, &c. In these cases, however, careful palpation below the last rib with the patient's leg flexed will reveal a tender mass, which, in the case of pyonephrosis, can be "got between the two hands" on bimanual examination, whereas in perinephritic abscess though, with one hand in front and the other behind, the mass can be felt, it cannot be got definitely between the two hands.

TREATMENT.

In the majority of cases of serous pleural effusion absorption begins within two or three weeks, and continues without the employment of any but simple conservative measures until the fluid has entirely disappeared. In this early stage, unless there are indications to the contrary, it is inadvisable to withdraw any of the fluid, because its presence keeps the two layers of the pleuræ apart and enables the inflamed surfaces to obtain that rest which is conducive to their healing. Again, as expressed by Sir Thomas Horder,[3] "the evolution of the process of exudation is not usually complete before the tenth day, and removal of the fluid before the high tide is reached is likely to lead to recurrence of the effusion."

*Indications for Removal of Fluid.*

Sometimes, however, the fluid either remains stationary or increases in amount until it leads to positive intrathoracic pressure. In either case the fluid must be removed.

1. When stationary, and by this I mean that if after two or the most three weeks there are no signs of absorption taking place, the fluid must be removed; otherwise the lung may remain partially collapsed and the breathing thus be permanently impaired.

2. Upon the supervention of the signs of positive intrathoracic pressure, no matter at what stage these signs make their appearance, the fluid must be withdrawn without delay. The principal signs of positive intrathoracic pressure are extension of dullness above the third rib, with disappearance of skodaic resonance, bulging of the chest wall, and crepitations over the base of the opposite lung due to œdema. These signs may be accompanied by marked dyspnœa on slight exertion cyanosis, and palpitation with irregularity of the pulse. Not infrequently, however, with a patient kept entirely in bed, these subjective symptoms are absent though the physical signs of positive intrathoracic pressure are well marked. It is, therefore, very important to examine the chest daily in cases of pleural effusion.

*Removal of Fluid.*

When for any of the reasons stated above it is necessary to remove fluid, it is best to withdraw it slowly, preferably by trocar and cannula and syphonage. If it is removed by aspiration the negative pressure in the aspirator should be very slight; Dr. George R. Murray [4] suggests that ten minutes should be allowed for the removal of each pint, otherwise the fluid will escape quickly and there may be a sudden expansion of the lung—which, in tuberculous cases, is a source of danger, in that there is frequently a tuberculous focus in the lung, kept in abeyance by the collapsed lung, but which on sudden expansion of the lung might extend. Another point to bear in mind when removing fluid from a chest is that it is not necessary, even if possible, to remove it all. The needle should be withdrawn if the patient complains of great pain in the side, begins to cough violently, faints, or shows obvious distress; removal of a portion of the fluid will allow the mouths of the lymph channels to open, and the remainder of the fluid will in consequence be more readily absorbed.

*References.*—1. Hale-White, Sir William: Practitioner, July, 1921. 2. Powell, Sir R. Douglas, and Hartley, Sir Percival Horton-Smith: Diseases of Lungs and Pleuræ, sixth edition, p. 120. 3. Horder, Sir Thomas: Medical Notes, Oxford Medical Publications, p. 58. 4. Murray, George R.: THE LANCET, 1902, i., 1447.

THE LATE DR. DAVID LLEWELLYN DAVIES.—Dr. Davies, who died recently at the age of 80, had been medical officer and public vaccinator to the Neath Union, and was mayor of the town in 1893 and again in 1910. Qualifying with the L.R.C.P., L.R.C.S. Edin. in 1873, he graduated at Glasgow University in the following year and took up practice in Neath, where, in conjunction with Dr. J. M. Morris, he had a large clientèle. He had been a member of the Neath Town Council for over 30 years and was an alderman of the town and justice of the peace for the borough. His death occurred in consequence of a compound fracture of the leg owing to a fall.

# An Address
ON
# DYSPITUITARISM, OBESITY, AND INFANTILISM.

*Delivered before the South-West London Medical Society*

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INVESTIGATIONS in recent years have directed attention to the extraordinary results which follow disturbance of the functions of the pituitary body. The interest aroused by the observations of clinicians and by the result of experimental research has been stimulated by the efforts of surgeons who have explored the various avenues leading to the resting place of this secretive body. The pituitary gland is an entirely intracranial structure, situated in the pituitary fossa of the sphenoid bone formed by the sella turcica. The fossa is closed above by the dura mater through an opening in which passes the stalk or infundibulum. Above and in front is the optic chiasma from which the optic tracks pass backward in relation to the infundibulum. At each side are the cavernous sinuses through which pass the third, fourth, sixth, and ophthalmic division of the fifth nerve. The gland consists of two definite lobes, which can be easily separated owing to the presence of a cleft. The anterior lobe is pink in colour owing to the numerous blood-vessels, while the posterior lobe is white and soft. The anterior lobe is considerably the larger, and envelops the posterior lobe laterally. The gland is supplied by numerous small arteries from the circle of Willis, which gain access along the stalk, and the veins drain into the cavernous sinuses and the anterior and posterior communicating sinuses. The transverse diameter in an adult may be taken as 12 to 15 mm., and the vertical and antero-posterior diameters as 5 to 8 mm., approximately half an inch transversely, and a quarter of an inch in each of the other directions. The weight in an adult is about 0·5 g.; in pregnancy it increases to 0·75 or even more.

## DEVELOPMENT.

The pituitary body is formed by the union of processes from two different embryonic structures. The anterior lobe is developed from an outgrowth in the roof of the primitive buccal cavity or stomodæum which is known as Rathke's pouch. Behind this pouch there develops a recess of the cerebral vesicle (the thalamencephalon), which eventually forms the infundibulum and a portion of the posterior lobe. Rathke's pouch deepens, and about the end of the third week its neck is constricted by the growth of the sphenoid cartilage, the remains of the cavity finally forming the cleft between the anterior and posterior lobes. The anterior wall of Rathke's pouch develops into the pars anterior or pars glandularis, while the posterior wall unites with the nervous portion to form the posterior lobe. In the human being the cavity of the infundibulum becomes obliterated, but in certain animals it remains patent in continuation with the third ventricle.

## HISTOLOGY.

Histologically, three divisions of the pituitary can be recognised: 1. Pars anterior or glandularis, separated from the remainder by the cleft, and entirely derived from the primitive buccal cavity and consequently from extoderm. It constitutes the anterior lobe. 2. Pars intermedia, a narrow epithelial lining on the posterior wall of the cleft. This has the same developmental origin as the anterior lobe, although a division at the cleft leaves it as part of the posterior lobe. At the margins of the cleft it fuses with the pars anterior. 3. Pars nervosa, forming the bulk of the posterior lobe, and being the portion derived from the down-growth of the cerebral vesicle.

*Pars Anterior.*—This consists of epithelial cells arranged roughly in tubular grouping separated by numerous blood-vessels and by blood-sinuses. Three types of cells can be recognised: (*a*) Chromophil. These contain granules, especially in the side adjoining the sinuses, and thus resemble cells in other glands with internal secretion. Two types of chromophil cells are present: (i.) eosinophil, and (ii.) basophil, mainly situated at the periphery of the lobe. (*b*) Chromophobe. Small clear, non-granular neutrophil cells.

These three types are apparently similar cells in various secretory stages. The small chromophobe cells are probably cells which have discharged their secretion. The eosinophil cells are active, containing secretion which will shortly pass into the circulation. Bell suggests that the basophil cells are storing their secretion. In certain conditions, especially pregnancy, large chromophobe cells are found, and this is suggestive of very active secretion, the products being rapidly discharged as soon as formed, and hence no granules forming in the cells. The secretion is sometimes recognisable in the tubules and blood sinuses, and in some circumstances definite patches of colloid may be present, especially after thyroidectomy. It is generally accepted that the secretion passes directly into the blood sinuses and thus into the circulation.

*Pars Intermedia.*—This is formed of polygonal neutrophil epithelial cells lining the cleft, and fusing at its margins with the pars anterior. A nest of similar cells is present at the base of the third ventricle. The blood-supply is much less in this part.

The so-called "hyaline bodies" are seen in this part and would appear to be produced by degeneration of the cells. In some circumstances definite colloid is present, and may form microscopic cysts to an extent which is never seen in the pars anterior. The origin of this colloid is doubtful; it may be produced either as a secretion or by degeneration of the cells: it never contains iodine.

*Pars Nervosa.*—This is formed of neuroglia, and contains no true nerve cells or fibres. Herring first showed that it contains the granular hyaline bodies which can be traced from the pars intermedia. In certain circumstances—for example, after removal of the thyroid—their number is greatly increased, and they can be traced in the infundibulum to the floor of the third ventricle, and Herring has also described them in the ependymal walls lining the third ventricle; it is generally accepted that this is secretion of the pars intermedia passing through the pars nervosa on the way to the third ventricle and the cerebro-spinal fluid. Possibly the secretion is altered in some manner during its passage. There is no evidence that the pars nervosa produces any secretion of its own.

## ACTION OF THE SECRETION OF THE PITUITARY.

It is evident that there are three portions of the gland which may produce secretion, the pars anterior, pars intermedia, and pars nervosa. The latter two together form the posterior lobe, and separation is a matter of great difficulty. Where this has been effected it is found that the pars nervosa has a similar but more powerful action than the pars intermedia. This action is probably the result of the presence of a large amount of the secretion of the pars intermedia. Investigations at the present time are mainly directed towards the anterior and posterior lobes, considered separately. It is, however, possible that Blair Bell is correct in his contention that in the organism the whole gland acts together. The principal methods of investigating the action of the gland are: (1) Administration of the gland or extracts by the mouth or by intravenous injections; (2) experimental removal of the whole or portions of the gland; (3) clinical observations of the result of diseases or abnormalities of the gland. By these methods the actions of the whole and separate parts are becoming understood, but many inconsistencies and difficulties are still unexplained.

1. *Experiments on the Whole Pituitary.*—It has been disputed whether the pituitary is essential to life. Recent investigators are practically in agreement that the removal of the whole gland is followed by rapid death. This is supported by Cushing, Paulesco, and Bell.

2. *Anterior Lobe.*—The removal of the whole of the anterior lobe is followed by rapid death, but in a few cases, where Cushing succeeded in keeping the animals alive for some time after almost complete removal, the condition was characterised by lethargy, low temperature, and finally coma, named by Cushing cachexia hypophyseo-priva.

No definite effects can be traced as the result of administration of extracts of the anterior lobe, either by the mouth or intravenously. In certain diseases of the pituitary the temperature is subnormal, and Cushing found that this can be raised by injections of the anterior lobe, the so-called "thermic reaction." Partial removal of the anterior lobe leads to definite changes, although there is considerable difference of opinion as to the exact results. Paulesco, who was the first to perform this successfully, noted adiposity. Cushing found both adiposity and genital infantilism, and recognised that this was identical with the clinical condition previously described as dystrophia adiposogenitalis. It is generally agreed now that atrophy of the genital organs follows this operation, but the adiposity is open to doubt. Bell did not find it, and Cushing on clinical grounds has come to the conclusion that adiposity is connected with the functions of the posterior lobe. Clinical observations give one definite evidence of certain functions of the anterior lobe. It may be accepted that acromegaly and some forms of gigantism are due to overaction of the anterior lobe. These conditions are characterised, briefly, by overgrowth of the skeleton, changes in the soft parts, and retention of calcium and magnesium.

Considering these results together, the secretion of the anterior lobe apparently produces: (1) Increase in growth of the skeleton, and also of the skin and subcutaneous tissues; (2) increase in growth and persistence of function of the sexual organs. Other functions may be: (3) Diminution of excretion of calcium and magnesium (perhaps connected with the skeletal growth); (4) influence on the carbohydrate metabolism. There is some evidence that an increase of secretion of the pars anterior produces hyperglycæmia, but it is certain that injections of the extract of the posterior lobe have this effect and the relations of the two lobes is doubtful. Some other functions are still unsettled. A subnormal temperature is found after removal of the anterior lobe, and this is raised by injections of the extract.

3. *Posterior Lobe.*—Investigations of the functions of this lobe produce results differing remarkably from those of the anterior lobe. It is generally accepted that removal, either total or partial, produces no definite symptoms, while injections of the extract have very marked results. The effect of intravenous injections are of extreme importance, and may be summarised as follows: (1) A pressor effect, which produces a marked rise of blood pressure due to constriction of the vessels; (2) contraction of unstriped muscle, especially marked in uterus, bladder, and intestines (Dale failed to find any effect on the intestines of dogs, but it undoubtedly occurs in human beings); (3) effect on the secretion of urine; (4) glycosuria and hyperglycæmia; (5) a galactagogue action; (6) the action of the heart is slowed and rendered more powerful.

Many other actions may be mentioned—constrictions of the pulmonary artery and coronary arteries, contractions of the bronchial muscles, diminution of the movements of respiration and inhibition of the secretion of the pancreas. Adiposity is certainly controlled, in some states, by the pituitary, possibly by the posterior lobe. With regard to these functions many interesting points arise. In the extracts of the lobe a depressor body is also present which causes a fall of blood pressure, and this effect is frequently seen before the rise occurs. It is possible that this depressor body is not a specific constituent of the gland, and it is produced mainly during manufacture. At one time it was thought to be histamine, but more complete investigations have disproved this. Another important fact is that if a second injection of the extract be given at a short interval after the first the specific effects do not occur. Thus there is no pressor effect on the circulatory system, but the fall in blood pressure does take place, and the danger of producing this result by too early a repetition of an injection is obvious. The effect on the heart is found not to be constant and cannot be relied upon. The effect on the renal secretion is of great interest. Schäfer and Magnus found that intravenous injections caused an increase in the size of the kidney and an increased secretion of urine, the renal arteries being dilated. This effect was not connected with the general rise of blood-pressure since it occurred after a second injection which, as is mentioned above, does not produce contraction of the vessels. As the result of this and similar experiments performed under anæsthesia it was for a time accepted that extracts of the posterior lobe has a diuretic effect due to specific action of the kidney. Later observations threw doubt upon this, especially experiments performed without anæsthetics.

Kennaway and Mottram have recently shown definitely that injections markedly reduce the secretion of urine both in normal individuals and in patients suffering from diabetes insipidus. It is now believed that the results obtained by Schäfer and Magnus and earlier experimenters only occur under ether anæsthesia, and it may be definitely accepted that intravenous injections of the posterior lobe markedly diminish the secretion of urine. Polyuria frequently occurs in injuries to, and diseases of, the pituitary. This fact will be referred to again later.

The glycosuria produced by injections will result as long as glycogen is present in the body. The condition differs from diabetes mellitus in that sugar is never produced from fat or protein. In Fröhlich's disease there is adiposity and hypoglycæmia, and Cushing connects these two by believing that the sugar is rapidly changed into fat. This is at present theoretical, and further, it cannot be held to be proved at present that adiposity is the result of abnormality of the posterior lobe. The galactagogue action is interesting; the increased flow is temporary, and measurements over 24 hours show no total increase. It is somewhat striking that an extract of the pituitary of a fish has this action on mammals. It cannot obviously have this effect on the fish, and, as Blair Bell observes, this shows that care must be taken in assuming that a result obtained by the injection of an extract is identical with the normal action of the gland. Administration of extracts by the mouth has no apparent effect. The result of the use of fresh glands by the mouth has not yet been fully investigated, but there is some evidence that it is effective. The dosage necessary is so large that it can never become a practical method of administration.

## SYMPTOMATOLOGY.

The best classification of the numerous symptoms which may occur in lesions and abnormalities of the pituitary gland is that suggested by Cushing. He divides the symptoms into four groups: (1) Neighbourhood symptoms due to local pressure effects; (2) general pressure manifestations caused by rise of intracranial pressure; (3) secretory or glandular symptoms proper; (4) polyglandular syndromes.

### 1. *Neighbourhood Symptoms.*

These are obviously produced by increase in the size of the gland, and are consequently associated with hyperplasia or tumours.

(A) Headache. There appears to be a true pituitary headache, usually bitemporal and often very severe. Cushing ascribes it to distension of the pituitary capsule.

(B) Ocular manifestations. (1) Primary optic atrophy. This is not unusual in one eye; some degree of papilloedema may occur subsequently. A definite "choked" disc is sometimes seen in one eye, with primary optic atrophy in the other. The choked disc

is ascribed to rise of intracranial pressure, while the pressure on the opposite optic nerve which has led to the atrophy is sufficient to prevent the disc from becoming swollen. (2) Alterations in the visual fields. The following types may occur: (*a*) Bitemporal hemianopia. This is the typical and classical form, but is not so common as was formerly believed. It is seen perhaps in 25 per cent. of cases in which the fields are affected. As Fisher has pointed out, the loss usually commences in the upper portion of the periphery of the field. (*b*) Disturbances of colour sense. These often precede hemianopia, a sequence to which Doyne has called attention. The loss for red may commence at the periphery, or as a scotoma, or it may commence at both sites and gradually merge. (*c*) Central scotoma resembling tobacco amblyopia. This may gradually extend to a temporal hemianopia, or not uncommonly a loss may also occur at the periphery, and the two gradually fuse. (*d*) Unilateral blindness may develop and be followed later by changes in the field of the opposite side. (*e*) Homonymous hemianopia is not uncommon. Walker and Cushing state that it is half as frequent as the better known bitemporal hemianopia. (3) Ocular palsies. These may result from pressure on the third, fourth, and sixth nerves in their course through the cavernous sinus. They are not common.

There is considerable difficulty in explaining exactly how a tumour of the pituitary can produce some of these effects. It is generally accepted that bitemporal hemianopia is due to a tumour of the pituitary pressing on the optic chiasma. Fisher has pointed out that the total breadth of the chiasma is only ¾ inch including the lateral non-decussating fibres, and consequently it would require a lesion of very narrow width, but of a considerable depth forward, to produce bitemporal hemianopia by direct destruction of the chiasma. The central scotoma is even more difficult to explain. The macular fibres are situated in the anterior portion of the chiasma, and it does not appear practicable that a tumour of the pituitary would first affect the anterior angle of the commissure, though this was the explanation given by Nettleship. The macular fibres, however, are apparently very delicate and might well be injured by a degree of pressure insufficient to damage until later other more resistant fibres in the chiasma. Changes in the vision are very frequently asymmetrical, one eye often becoming blind before the other is affected. Fisher is inclined to believe that this and many of the other changes are produced by an initial lateral pressure on the optic tracts behind the chiasma. The displacement of an optic tract then produces traction on the opposite optic nerve with resulting damage, or it may act by injuring the chiasma or by constriction of a displaced optic nerve against the bony foramen.

(C) Changes in the sella turcica. During life these are only recognised by radiography, now of very great importance in the investigations of the pituitary lesions. Cushing describes the changes as follows: (1) Thickening of the clinoid processes. This is confined to cases of acromegaly and gigantism, and is part of the general bony overgrowth. (2) Thinning of the walls of the sella and the clinoid processes. This occurs in adenoma of the gland, with symptoms either of late stages of acromegaly or of hypopituitarism. (3) General destruction of outlines. This may result from general pressure or from the invasion of a malignant tumour; the anterior clinoid processes usually persist. (4) Sella abnormally small. Occurs in primary glandular hypoplasia. (5) Sella normal. A tumour from the pituitary stalk may produce no changes in the sella.

(D) Pressure on portions of the brain. The most striking result of this is the occurrence of incimate fits from pressure on the hippocampus gyrus. These fits are characterised by disturbances of smell and a peculiar dreamy sense of unreality. The frontal lobes are sometimes affected with the usual results of torpidity and irritability.

(E) Naso-pharyngeal lesions. Epistaxis, discharge of mucus or of cerebro-spinal fluid may occur. This was noted by some of the earliest writers on medicine. Exophthalmos occurs rarely with the large tumours, probably due to pressure on the cavernous sinus. Trigeminal neuralgia results occasionally from pressure on the fifth nerve. Distension of the veins of the scalp and eyelids has been recorded.

### 2. *General Pressure Manifestations Caused by Rise of Intracranial Pressure.*

Headache is common and often severe, but this may be also a local effect as referred to above. Symptoms due solely to rise of intracranial pressure are rarely marked. Vomiting especially is not common, nor is any degree of choked disc.

### 3. *Secretory or Glandular Symptoms Proper.*

The pituitary has been found to exercise a special control on certain functions: (1) Growth of the skeleton. (2) Development and efficiency of the sexual functions. (3) Various metabolic and internal functions, especially deposit of fat, renal secretion of fluid, carbohydrate metabolism, and contraction of unstriped muscle. It is evident that there may be many varieties of abnormal action of the pituitary. First, there may be overaction or underaction of either the anterior or posterior lobes; overaction or underaction of one lobe may occur with either overaction or underaction of the other lobe. Secondly, overactivity of a lobe may be followed by underactivity, or before this final event there may be periods of quiescence with recrudescences of activity. Thirdly, the time of life at which the changes occur has a great influence on the effects produced.

It will probably need years of experimentation and observation before all these functions are pieced out. Certain groups of lesions can, however, be recognised, and to some extent correlated with changes in the pituitary and in the different lobes. (1) Gigantism and acromegaly. This is generally accepted as due to hyperplasia or overactivity of the pars anterior. (2) Dystrophia adiposogenitalis or Fröhlich's disease. The converse of a giant is in general terms a small fat person, which roughly describes this group. This is undoubtedly due to hypoplasia or underactivity of the pituitary. The pars anterior is involved, but it is uncertain how far the posterior lobe is concerned. (3) Polyuria. Hypoplasia of the posterior lobe may now be connected with diabetes insipidus for reasons which have been discussed previously. The converse of this condition would appear to be a diminished secretion of urine, but of this we have no knowledge at present.

### 4. *Polyglandular Syndromes.*

This is a very complex question which at present is little understood, but the relations to two groups of endocrine organs may be mentioned. (1) Sexual organs. The pituitary is known to increase in size and activity in pregnancy and after castration, while the removal of the pars anterior is definitely followed by atrophy of the genital organs. The condition of eunuchism closely resembles some of the syndromes of dyspituitarism. Adiposity occurs, and, of course, genital dystrophy. Skeletal overgrowth is common. (2) Thyroid gland. Thyroidectomy is followed by certain changes in the pituitary. The whole gland tends to enlarge and colloid is found in both the pars anterior and pars intermedia with great increase of hyaline bodies in the pars intermedia and pars nervosa. Similar changes are recorded by Bell in cretinism and parenchymatous goitre, and by Fry in myxœdema. Conversely in exophthalmic goitre the general appearance of the pituitary is of inactivity.

## CLINICAL MANIFESTATIONS OF DYSPITUITARISM.

*Gigantism and Acromegaly.*—Acromegaly was first described by Marie in 1886, and its connexion shown with disease of the pituitary. The knowledge that gigantism is frequently associated with tumours of the pituitary and that acromegaly often occurred in giants led to a recognition of a connexion between the two conditions, Massalongo in 1892 describing acromegaly

as "delayed gigantism." In 1895 Brissaud and Meige summed up the position in the words, "acromegaly is gigantism of the adult, and gigantism is acromegaly of the adolescent." As early as 1894 is was suggested by Tamburini that there were two stages of acromegaly which are now recognised as being early overactivity followed by a late underactivity. Marie's first theory was that acromegaly was due to hypopituitarism, as he regarded the tumours which he found as being destructive of the gland. Many difficulties arose as cases of tumour of the pituitary were recorded without acromegaly, and conversely acromegaly was recorded without obvious tumours. Cushing in 1908 observed that certain experimental operations on the pituitary which diminished its secretion led not to gigantism or acromegaly but to a converse condition resembling dystrophia adiposogenitalis.

More careful study of the pathology of the gland in recent years, especially by Cushing and his associates, confirms the view that in all cases of this group there is or has been at some period a state of overactivity. When a tumour is present it is always found to be an adenoma, and it is now agreed that the diagnosis of sarcoma previously frequently made was erroneous. In cases which cannot be regarded as adenoma there are evidences of hypersecretion shown by numerous eosinophil cells or large active chromophobe cells, the type described by Cushing as hypophyseal struma. Even when the gland at autopsy shows no obvious enlargement the size of the sella suggests previous increase in dimensions. In no instance of acromegaly has the sella ever been found below normal size. It is recognised now that overactivity of the pars anterior produces gigantism if it takes place before the epiphyses have united, and produces acromegaly if the epiphyses have previously united. Cushing's explanation of these phenomena is as follows: "Overactivity of the pars anterior during puberty leads to gigantism. The secretion may then temporarily become normal (as occurs with hyperthyroidism), and during this period of quiescence epiphysial ossification takes place; the subsequent recurrence of hypersecretion will then superimpose acromegaly on the gigantism. If the overactivity does not occur until after puberty acromegaly results without gigantism. A giant does not necessarily become acromegalic since there may be no return of overactivity after the epiphyses have united."

The principal changes of acromegaly are due to overgrowth of the acral portions of the skeleton. The hands increase in size, the phalanges become widened, and the extremity of the terminal bone becomes tufted in a characteristic fashion. The feet exhibit similar changes. In the skull the malar bone increases, while the growth of the lower jaw produces the characteristic facial aspect, the enlargement leading to an elongated chin and prognathism. The growth of the jaw causes spacing of the teeth. The vault of the skull also enlarges, causing general enlargement of the head. The changes in the sella have been mentioned above. In the skeleton generally there is also overgrowth of bone wherever stress occurs—e.g., at the origin and insertion of the muscles. As Keith has said, "the osteoblasts are hypersensitive to the various stresses which occur during life." Kyphosis is usual, and the chest may become of enormous dimensions. The changes in the skeleton are not merely deposition of bone below the periosteum, since the lower jaw and the hands and feet undoubtedly increase in length.

But the changes of acromegaly are not confined to the skeleton. The skin and subcutaneous tissues thicken and become coarse and rough, and the hair on the body becomes excessive. The nose and ears enlarge and the lower lip becomes prominent; the features in general develop a heavy aspect, the tongue often remarkably increases in size. The thickening may even involve the muscles. Radiographs show that the early enlargement of the hands and feet is due to the changes in the soft parts rather than to growth of the bones. The various neighbourhood symptoms described above occur both in acromegaly and gigantism, especially the ocular changes and alterations in the shape of the sella. The study of the metabolism indicates the two stages of acromegaly referred to above, an early hyperactivity being followed by a final hypoactivity. In the early stage glycosuria and hyperglycæmia are present, and frequently sexual excitement, while in the later stages hypoglycæmia and high carbohydrate tolerance are found, and usually impotence and amenorrhœa. Gigantism due to hyperpituitarism is often accompanied by prodigious strength. When acromegaly becomes superimposed this power is retained in the early stage and may persist throughout life. But when hypopituitarism follows the gigantic strength is lost, and the muscular weakness and general asthenia contrast strangely with the huge frame, enormous chest and hands, and almost gorilla-like aspect.

*Hypopituitarism and Adiposity.*

Fröhlich in 1901 described cases of adiposity and genital atrophy associated with lesions of the pituitary; to these conditions Bartels gave the name of "dystrophia adiposogenitalis." Cushing, as a result of his experiments in 1909, recognised that this condition resulted from deficiency of secretion of the pituitary. In some cases there are destructive tumours—for example, sarcoma—in others the lesion is a primary hypoplasia, and in a few cases it has resulted from intracranial injuries and from disease such as hydrocephalus interfering with the pituitary.

There are three principal symptoms: (1) Deficiency of growth. This is not sufficient to produce extreme stunting of stature. (2) Genital dystrophy or atrophy. (3) Adiposity. Neighbourhood symptoms may develop in any of the groups which will be referred to in this section.

The extent to which these symptoms are present will depend to a considerable extent on the time of life at which the abnormal action of the pituitary commences. Although the clinical division is not exact, the cases can be roughly placed in three classes according as the onset takes place—before puberty, during puberty, or after puberty.

1. *Onset before Puberty.*—This group is specially characterised by adiposity. In many of the recorded cases the stature has been not less than normal, and in some has been considerably greater. Genital dystrophy is not greatly marked, but most of the examples do not live to later puberty. Adiposity is universal and may produce the appearance which was described by Fearnsides as the "pudding-face type." Torpidity and somnolence is common and the carbohydrate tolerance is usually high. Many of the famous fat boys have belonged to this group; the Fat Boy in Pickwick may be considered to be an example, and Dickens was by no means inaccurate in picturing him as possessing an acute intelligence in his waking moments.

2. *Onset during Puberty.*—The typical example of this is dystrophia adiposogenitalis or Fröhlich's disease. The cardinal symptoms are: (i.) Skeletal undergrowth. In a male there is a tendency to feminine outlines, with a broad pelvis and the not infrequent presence of genu valgum and a characteristic delicate tapering of the fingers. (ii.) Genital dystrophy. The genital organs are small and infantile. The secondary sexual characteristics do not develop. In males the axillary and pubic hair is scanty or absent, while in females there is amenorrhœa and lack of development of the mammæ. (iii.) Adiposity. The deposit of fat tends in males to a feminine distribution, being especially marked round the hips and pelvis, but it is not confined to this site. In addition to these symptoms there are others that are connected with the internal functions—for example, subnormal temperature, low blood pressure, and high sugar tolerance. The nails are small and thin, the skin smooth and dry, and pigmentation may be present.

3. *Onset after Puberty.*—Mild degrees are probably not uncommon, characterised by a tendency to obesity and by amenorrhœa in females. Severe types correspond closely to what one might expect in

dystrophia adiposogenitalis developing in an adult. It is obvious that the skeletal undergrowth cannot occur. In males the deposit of fat has the same feminine distribution; there is often definite atrophy or reversion of the external genital organs to a more infantile type. In females the sexual changes are less definite, but amenorrhœa is a noticeable feature.

*Adiposis Dolorosa or Dercum's Disease.*

In this condition there is obesity with pain and tenderness of the fat. It is almost confined to females after the menopause. In many instances tumours of the pituitary have been present. It was noticed by Dercum that mental changes might occur, and Vitant (quoted by Cushing) describes the four cardinal symptoms as adiposity, pain and tenderness of the fat, asthenia, and psychosis. The pain may be of two types, either a general tenderness of the fat on pressure or a localised form in which painful red nodules develop. The latter type is probably due to lymphangitis, resembling the attacks which are well known in elephantiasis. A combination of obesity with tenderness of the fat must not always be ascribed to lesions of the pituitary. Women frequently grow fat rapidly after the menopause and complaints of pain often have a functional basis, but the possibility of a pituitary origin should be borne in mind.

*Hypopituitarism, Polyuria, and Diabetes Insipidus.*

The relation of polyuria to the posterior lobe secretion has been referred to above. It has long been noticed that polyuria may follow injuries to, or operations on, the skull. Cushing noted this occurrence after operations on the pituitary and was struck by the fact of its immediate onset and of its frequent transient duration. Many recorded cases of diabetes insipidus have been proved to be due to lesions either directly or indirectly involving the pituitary body. One of the cases investigated by Kennaway and Mottram was due to a bayonet wound, and thirst and polyuria commenced the same day. I have recently published a similar case due to a bayonet wound, and in this instance also the man is quite certain that he noticed thirst and polyuria immediately on recovering consciousness. In both these cases the symptoms have persisted for several years. Kennaway and Mottram's experiments may be held to prove definitely that polyuria and diabetes insipidus may result from deficiency of secretion of the posterior lobe. It is interesting to note that a considerable number of cases are on record in which polyuria has resulted from a neoplasm of the pituitary secondary to a carcinoma of the breast.

INFANTILISM.

It is evident that Fröhlich's disease is a true infantilism. There has been much discussion, especially among the French, as to what constitutes infantilism, and references to these articles will be found in Cushing's monograph on the pituitary body. Unfortunately, much of this dates back before the days when the rôle of the pituitary was recognised, and the influence of the thyroid was exaggerated. There is clearly a distinction between dwarfism and infantilism: dwarfism is merely a marked deficiency of stature, and it would be incorrect to describe the result of tuberculosis of the spine as infantilism. Brissaud and Meige define infantilism as a condition in which "the characteristics appertaining to infancy persist after puberty." The essential point of this definition is the lack of development of the secondary sexual characteristics. This is perhaps the best definition at the moment. In the description of Fröhlich's disease both in children and adults it has been noted that males develop certain feminine characteristics. It is probable that Blair Bell adopts the correct attitude in interpreting the changes in hypopituitarism as being towards a "neutral" type both in males and females, a standpoint which is supported by the occurrence of amenorrhœa in women. It is incorrect to consider that the tendency is towards the reversion of the sexes. Somewhat similar conditions occur in tumours of the suprarenal glands which have been studied especially by Bulloch and Sequeira and by Glynn. In this condition a male acquires still further characteristics of "masculinity," while the female acquires some of the characteristics of the male. In no case is there a tendency to femininity.

We have discussed briefly in earlier sections the question of which lobe or lobes is at fault in this syndrome. Cushing found that the subnormal temperature could be raised by injections of the anterior lobe, while the high sugar tolerance and low blood pressure were reduced towards the normal by injections of the posterior lobe extract. These results are in accordance with the experiments of Blair Bell and of Cushing himself that the reproduction of dystrophia adiposogenitalis is only affected by a lesion involving the whole pituitary. Cushing ascribes the skeletal undergrowth and genital dystrophy to the anterior lobe and the adiposity to the posterior lobe. If this contention is correct one might expect to find instances where overactivity of the anterior lobe was combined with underactivity of the posterior lobe, a combination which would be expected to produce skeletal overgrowth, sexual precocity, and adiposity. Many such cases are on record. But other syndromes occur which cannot be explained on this theory. Thus skeletal overgrowth may be combined with sexual infantilism, while in other cases skeletal undergrowth is combined with sexual precocity. If these two functions are controlled by the same secretion it is difficult to understand how they can be varied in opposite directions. It is possible that some of these cases are to be explained by deficiencies in other ductless glands, either primary or secondary to the pituitary lesion. The most important of these are the sexual glands. Adiposity and skeletal overgrowth are known to occur in eunuchs, and it is possible that some of these abnormal syndromes are due to a primary testicular atrophy with a secondary pituitary hyperplasia, a theory which has been strongly upheld by Tardl and Grosz. At present this must remain uncertain, but we may accept it as established that the syndrome of Fröhlich's disease is due to hypoplasia, undoubtedly of the anterior lobe and possibly of the posterior. It is possible that each of the cardinal symptoms is connected with a separate hormone.

*Ateleiosis or Type Lorain of Infantilism.*

This remarkable type differs in some respects from all other forms of infantilism. A subject examined after puberty more or less has the bodily proportions of an adult, that is to say, the body suggests an adult cast in a small mould. It is, however, true infantilism, since both in males and females the secondary sexual characteristics do not fully develop. In males the bodily hair does not grow, the voice remains high pitched and youthful, and the genitals are small though well formed. In females the breasts do not develop. The frame is generally thin and delicate and the skin soft. Radiography has shown that the epiphyses do not unite, or only at a late age, though there is no irregularity in the development of the bone. Cushing describes a case with polyuria, and it is probable that the carbohydrate tolerance is increased. The intelligence varies; sometimes it is defective, but this is not invariably so, and instances certainly occur when it is above normal. It is not yet proved that this type is invariably due to deficiency of the pituitary, but several cases are recorded where tumours and cysts have been present, and in these instances it is probable that there is defective secretion of the anterior lobe. It is uncertain whether the posterior lobe is normal or deficient.

*Classification of Infantilism.*

The following summary of the causes and types of infantilism may be given:—

I. *Alterations of Internal Secretion.*—1. Thyroid deficiency. Classical type: Cretinism. Minor degrees probably occur not infrequently. Brissaud described a type of partial infantilism with round head and

general plumpness, and considered it was due to thyroid deficiency. The influence of pituitary lesions was not then recognised and it is a little doubtful to what Brissaud was referring. 2. Pituitary deficiency. Classical types: (*a*) Fröhlich's disease; (*b*) Fearnsides' pudding-face type; (*c*) ateleiosis or type Lorain. Possibly a type with diabetes insipidus. 3. Renal infantilism. Classical type: Albuminuria, arteriosclerosis, high blood pressure, cardiac hypertrophy, and bony changes clinically but not pathologically resembling rickets. Renal sclerosis is found at autopsy. Albuminuria may be absent, and also the high blood pressure. Late rickets usually but not invariably belong to this type. 4. Pancreatic infantilism. Associated with large bulky pale stools. Gee's cœliac disease belongs to this group. 5. Suprarenal deficiency. Progeria, the very rare type of senile infantilism described by Hastings Gilford, is possibly of suprarenal origin. There is extreme arteriosclerosis. Precocity certainly occurs with overaction of the suprarenals. 6. Deficiency of the sexual glands.

II. *Cachectic Conditions and Organic Diseases.*—Many chronic diseases in childhood may delay development. The infantilism is partial rather than complete. 1. Syphilis. 2. Heart disease, congenital or acquired. The more slowly a child develops during puberty the better is the expectation of life. 3. Mental and nervous diseases. Of these there are many grades and varieties. Microcephaly is a well-known example. The origin of Mongolism is unknown. 4. Intestinal infantilism. Herter's type with loose motions. The distinction between this and pancreatic infantilism is often uncertain. 5. Ankylostomiasis or hookworm disease. Malaria.

Many cases are unclassifiable, and no doubt other causes exist. Vitamin deficiency may be a cause, for pellagra produces partial infantilism. Starvation and early indulgence in alcohol producing cirrhosis may be included. The schoolboy is always told that smoking at an early age stunts growth, but the evidence is doubtful. Precocity to an amazing degree develops with certain tumours of the suprarenals and pineal glands.

## SUMMARY OF THE FUNCTIONS OF THE PITUITARY GLAND.

The following is a provisional summary of the clinical manifestations produced by disturbances of the secretion.

*Anterior Lobe.*—A. Over-secretion: (i.) Before union of the epiphyses produces gigantism. (ii.) After union of the epiphyses produces acromegaly. B. Under-secretion: (i.) Before puberty; type Lorain of infantilism. (ii.) After puberty; condition unrecognised.

*Posterior Lobe.*—A. Over-secretion: Condition unrecognised. B. Under-secretion: Diabetes insipidus.

*Whole Gland.*—Diminution of secretion produces dystrophia adiposogenitalis, syndromes of adiposity, genital dystrophy, and infantilism, varying in type according as it commences before, during, or after puberty.

## TREATMENT.

Organotherapy of the pituitary gland is still in the experimental stage, but certain facts are fairly established. Obviously it is only in conditions where there is a deficiency of secretion that administration in any form can be of value, and therefore it should not be employed in the active stage of gigantism or the early stage of acromegaly. As in organotherapy of other glands the effect of a dose cannot be expected to be more than temporary, and consequently when the deficiency is chronic permanent repetitions of the dose will be necessary. It is here that a special difficulty of pituitary organotherapy arises. To obtain any result by oral administration involves a dosage which is outside all practical possibilities, while there are obvious objections to giving daily injections whether these be intravenous or the less effective subcutaneous and intramuscular.

It is obvious that in treating hypopituitarism some test is necessary by which we may know whether a correct and sufficient dosage is being administered. In cases with obesity loss of weight will suggest itself, but this is not so satisfactory as it is in thyroid medication. In certain of Cushing's cases the psychical effect of administration was temporarily distinct, torpidity and somnolence being greatly reduced, but such criteria are unsatisfactory. Cushing has suggested two tests; in cases where there is apparently a deficiency of the anterior lobe secretion, a subnormal temperature is usual, and this is found to be raised by injections of the anterior lobe, the so-called thermic reaction. The occurrence of this reaction may be considered to demonstrate that the dosage is effective.

Cushing's second test for the posterior lobe secretion is more satisfactory. In hypopituitarism there is an increased tolerance of carbohydrates. Cushing gives repeatedly a solution of glucose or lævulose, of an amount on which an ordinary individual would secrete sugar in the urine, and increase the dosage of pituitary extract until the sugar appears in the urine of the patient. In many instances this point is never found, and Cushing has administered as much as 300 gr. daily of Armour's preparation without producing glycosuria. Even in the most successful cases it may be taken that an efficient dosage is not under 10 gr. daily of Armour's extract when given by the mouth, which corresponds to about 15 bovine glands. Cushing has tried implantation of fresh glands in the tissues, but it is doubtful if this can have permanent effects. We must apparently hope that the active substances will be identified and their synthesis effected.

Injections of the extract of the posterior lobe has various effects, as described above, but obviously it can have no action on deficiency of the anterior lobe. Goetsch has estimated that the intravenous injection of the extract is at least eight times more powerful than its oral administration. Its action in diabetes insipidus has been explained above, the excretion of urine being halved while treatment continues. In this as in other chronic forms of hypopituitarism constant injections are necessary to maintain the effect. For the present the principal use of injections of extracts of the posterior lobe is in certain transient conditions. It must always be remembered that until the effects of the first injection have worn off the second injection does not produce its specific actions, while the depressor effect on the blood pressure will occur. An interval of two hours is the minimum between the injections, and probably three hours is preferable. The effect of injections on the uterus is now well established, and the indications for its use are set forth in all works on obstetrics.

During the war it was largely used in the treatment of shock, the credit for suggesting this use being due to Blair Bell. It may also be used in serum sickness, and has been tried, though with doubtful value, in asthma. Its action on the alimentary canal is of great value, as injections will result in movements of the bowels, and it may be used in many cases where the peristalsis of the intestine is temporarily diminished. It is of special value in reducing the troublesome meteorism which occasionally occurs in such conditions as typhoid fever. The action on the heart is now known to be uncertain, and it is unwise to employ pituitary extract in cases of cardiac depression.

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# THE PATHOLOGY OF SYDENHAM'S CHOREA.

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THE nature and cause of the manifestations of chorea minor have been the object of investigation for many years among clinicians, pathologists, and more recently among bacteriologists; later advances in neuro-pathological and bacteriological methods, together with many clinical reports of cases, have assisted the evolution of the modern conception of disease. A brief historical retrospect of some of the older theories of chorea may be of interest.

## *Historical Retrospect.*

As early as 1840 Todd[1] and others were already teaching the relationship between chorea and the rheumatic diathesis, but no causal connexion between chorea and valvular heart disease complicating rheumatic fever was considered until somewhat later. Dr. James A. Wilson (1843) attributed the phenomena of chorea not to the nervous system but to a morbid blood affecting the muscular system. To this explanation Todd objected, claiming "that since the seat of active nutrition was in the mesocephale, a state of the blood, prejudiced by the rheumatic diathesis acting upon the mesocephale, was responsible for the manifestations of chorea." Todd's conception was further elaborated by Kirkes[2] and Hughlings Jackson,[3] who expounded the "embolic theory" of chorea. Their conclusions were influenced by the preponderating number of their choreic patients who suffered from valvular heart disease. These authors were among the first to connect cardiac vegetations with chorea. Jackson located the seat of the lesions in chorea "in the nerve tissue forming the convolutions *near* the corpus striatum, this part of the brain being supplied by branches of the middle cerebral artery." He maintained that if the ganglia were destroyed paralysis resulted, whilst if only an impairment or perversion of their function occurred, chorea resulted. This embolic theory of Kirkes and Jackson gained widespread acceptance, and was supported by Russell Reynolds in his text-book on the diseases of the nervous system.

In 1868 Ogle[4] reported 16 fatal cases of chorea. The cardiac conditions in his cases confirmed Jackson's findings. Ogle, however, opposed the embolic theory, and rather believed that "the predisposing cause of chorea was an altered condition of the blood." Broadbent (1869),[5] in a series of articles, supported Jackson's views in many particulars. He agreed that "the most frequent and most important cause of chorea was no doubt embolism of the minute vessels of the sensori-motor ganglia," but insisted that "other cases occur which are inconsistent with this condition." He regarded chorea as "a symptom rather than a disease, which cannot be referred to any single pathological condition, but as symptomatic only of the seat of the disease, and arises out of the function of the part affected." "Chorea is," according to Broadbent, "a delirium of the sensori-motor ganglia, which may be caused not only by embolism, but by hyperæmia of the vessels not blocked, or by a morbid condition of the blood." He therefore laid stress on the seat of the disturbance with its altered function rather than on the nature of the lesion.

In 1869 Bastian[6] first offered his *thrombosis theory* of chorea, and in 1877 stated it in the following terms:—"Chorea was effected by an altered and often anæmic state of the blood as its predisposing cause, in an individual of certain age and nervous temperament. The initiation in such an individual of a disturbed nutrition in the corpora striata and adjacent parts of the brain tended to issue in what may be called a subacute inflammation of these centres, often characterised in part by the production of multiple minute thromboses." Maragliano (1899)[7] elaborated Bastian's theory by considering chorea the result of a toxic infectious process. He believed that "chorea is in a certain number of cases a complication in a special localisation of an infectious disease, either septic or toxic." This has since been called the "*toxi-infectious theory*" of chorea.

For a decade previous to this time investigators were working on the bacteriological status of chorea, and in 1899 Wassermann, Westphal and Malkoff[8] isolated a diplococcus from the pericardial and cerebro-spinal fluids of a child dead of rheumatic pericarditis and chorea. Dana (1894),[9] Poynton and Paine (1901–3),[10] Batten and Walker (1903),[11] among others, isolated a similar coccus in their cases. Poynton and Paine named this coccus the *Diplococcus rheumaticus*. Some investigators were able to recover a staphylococcus, and others *Streptococcus viridans*, from the blood of their choreic patients.

The monumental work of Poynton, Paine, and Holmes confirmed the work of previous investigators, and crystallised our present conception of rheumatism and chorea. They not only recovered *D. rheumaticus* from the blood, cerebro-spinal fluid, and even from the brain and its membranes, but they were able to produce irregular movements, carditis, and arthritis experimentally in rabbits by intravenous injections of the diplococci obtained from their fatal cases, and, further, to demonstrate the diplococci in the brain and pia mater of the rabbit that had shown irregular movements. Their conclusions, drawn from evidence accumulated for years from the clinical, pathological, and bacteriological aspects of the disease, were that the great majority of cases of chorea are rheumatic in nature, and that rheumatic chorea is the outcome of an infection of the brain and its meninges with the *Diplococcus rheumaticus*; that the pathological changes in chorea consisted of vascular and inflammatory lesions, the chief of which were hyperæmia, and the presence of thrombosed vessels in the central nervous system and meninges. They saw no emboli in the sections studied. In the acute stages slight local lesions consisting of hæmorrhage, thrombosis, and perivascular round-cell infiltration and exudation were found external to the blood capillaries, while in the more chronic cases there was also a perivascular fibrosis. Chromatolysis was present in varying degrees in the nerve cells throughout the cortex and basal ganglia. The pons, medulla, and cerebellum were little affected except for vascular congestion, and round-celled infiltration of the sheaths of the nerves issuing from them.

Delcourt and Sand (1908)[12] found in their 16 fatal cases of chorea extreme hyperæmia in the nerve centres, occasionally extending to the formation of hæmorrhages, and perivascular infiltration, alterations in the nerve cells, especially in the cortex and basal ganglia, with secondary neuronophagia, and cellular and fibrillary gliosis. The most intense lesions were seen to be in the basal ganglia, while those in the cortex, cerebellum, and meninges were less prominent. The changes in the bulb, spinal cord, and spinal root ganglia were very slight.

In 1910 Guizzetti and Camisa[13] published an account of the pathological changes in two fatal cases of chorea, both of which were complicated with endocarditis. They concluded that "the pathological lesion in chorea minor was a disseminated encephalitis involving the pia mater, and associated with numerous ischæmic foci in the brain resulting from embolism of the cerebral arteries; these changes were constantly accompanied by slight changes in the nerve cells of the cerebrum, especially in the cortex, and are certainly due to attack by a special form of organism by way of the blood-vessels."

As recently as 1920 Harvier and Levaditi[14] concluded "that certain acute febrile choreas are determined by the virus of epidemic encephalitis, although not all the acute febrile choreas were caused by this agent; that it is possible that Sydenham's chorea in children is in certain cases determined by the virus of epidemic encephalitis." The lesions found in their cases were predominantly mesencephalic, and were less prominent in the spinal cord. They consisted histologically of (1) much hyperæmia, and (2) small round-celled perivascular infiltration. No neuronophagia noticed.

Among the most recent studies has been that of Pierre Marie and Trétiakoff.[15] These authors found constant and identical lesions in the nerve centres of fatal cases of acute chorea—viz., a "large extent of inflammation, most of which is at the level of the basal ganglia with equally severe inflammation of the cerebral cortex. As one reaches the mesencephalon the morbid process is rapidly attenuated." They conclude that the pathology of chorea "is apparently above all an irritative process characterised by an intense hyperæmia and much infiltration of the tissues by leucocytic elements and by neuroglial and connective tissue proliferation."

## *A Fatal Case of Acute Chorea.*

It may be concluded from a study of the above that there is still much to be written about the pathology of the disease. It is therefore useful to record still further observations and studies of fatal cases. With this in view the following case of acute chorea, with death supervening on the tenth day, is detailed.

The patient, A. M. (female), aged 7 years 7 months, was admitted to the Hospital for Sick Children, Great Ormond-street, under Dr. Robert Hutchison, on April 27th, 1920, with a history of "St. Vitus's dance" of one week's duration.

*Family History.*—Father, aged 50, suffered from sciatica and lumbago. Mother, aged 43, had had rheumatic fever three times as a child. One brother, aged 14, had had muscular rheumatism in the leg for seven months. Another brother and three sisters were alive and well. The family of eight lived in a five-roomed house which was damp.

*Personal History.*—A full-time child, normal birth and development, measles at 5 years, whooping-cough and German measles at 6 years.

*Present Illness.*—Up to the onset of the disease the child had been apparently well and attending school. St. Vitus' dance appeared suddenly on April 20th. When handed a piece of bread the child dropped it and kept "twitting about." When she tried to put the bread into her mouth she jerked her arm up to her face and over her shoulder. She also kept moving her legs about and could not keep still. This condition gradually became worse, and for four days prior to admission to hospital she had been unable to feed herself. The right side of her body had become very weak.

*Condition on Admission.*—The patient was a dark-haired, well-developed, poorly nourished girl of 7¼ years. She was quite intelligent and could carry out commands, but did not speak. The skin and mucous membranes were pale. The respirations were 80 per minute. There was some dyspnœa with expiratory grunting and use of the accessory respiratory muscles. The child showed occasional choreic movements of her hands, but otherwise lay quite still in bed. With the exception of bossing of the forehead there was no skeletal sign of rickets. A few small rheumatic nodules were seen on the elbows, but none on the occiput or knees. The finger-tips were slightly cyanosed and expanded laterally, but not clubbed. The superficial lymphatic glands were not enlarged. The tongue was furred and flabby, and the tonsils much enlarged but not inflamed. Temperature 99° F., pulse 144, respiration 80 per minute.

*Cardio-vascular System.*—The præcordia bulged slightly, especially in the fourth and fifth intercostal spaces. The heart-beat was diffuse, being visible in the third, fourth, and fifth spaces, and causing pulsation in the epigastrium. The maximum impulse was felt in the fifth space just inside the nipple line. The area of cardiac dullness reached from outside the right border of the sternum to 1 cm. outside the left nipple line in the fourth intercostal space. The heart rhythm was galloping and the sounds difficult to analyse. No murmurs were detected.

*Respiratory System.*—The percussion note was impaired in the left interscapular region from the level of the fourth dorsal spine to below the angle of the scapula. In this area the breath sounds were tubular; elsewhere they were harsh. No rhonchi or râles were anywhere heard.

*Digestive System.*—Normal.

*Nervous System.*—The eyes reacted to light. The knee-jerks were not obtained. The plantar responses were of the flexor type.

On April 29th the temperature was normal, respirations 58 to 68 per minute, pulse 130. No choreic movements could now be seen. On the 30th the pulse and temperature remained the same; the patient became steadily weaker, and died on the same day.

*Post-mortem Examination.*—This was performed six hours after death, and the following notes were taken: Well-developed child, length 48 in., weight 41 lb. Trachea and larynx normal; a gland at bifurcation of trachea much enlarged. The pleural and pericardial cavities normal. *Lungs* œdematous throughout, but showed no consolidation. *Heart* was much enlarged, weight empty 6¼ oz. The right side was considerably dilated. Vegetations were seen on both the mitral and aortic valves, those on the latter being few and small, while those on the mitral valves were large and luxuriant. Cultures made from the heart's blood remained sterile. Smears from the vegetations on the valves showed a few doubtful cocci. The abdominal cavity contained a certain amount of clear fluid. The liver looked pale and fatty and weighed 1 lb. 11¾ oz. The spleen weighed 3 oz., right kidney 2 oz., left kidney 3 oz. The brain on naked-eye observation showed no obvious abnormality.

### *Detailed Appearance of the Brain.*

The brain was hardened as a whole in formalin, and only some months afterwards was it decided to investigate it by microscopical examination. As a result of the long formalin fixation it was found impossible to get satisfactory staining of the nerve cells by Nissl's method, but hæmatoxylin with eosin or van Gieson's counter-stain gave satisfactory staining for the examination of the pathological changes. An examination of sections taken from various parts of the brain showed that everywhere above the pons there was evidence of slight encephalitis. This was evidenced by an excess of small round cells within the tissues both in the grey and white matter, by dilatation of blood-vessels, and by neuronophagy of nerve cells in varying degree.

The appearances were very similar to those seen in many cases of encephalitis lethargica, especially in the earlier stages, with the difference that whereas in that disease the inflammatory changes are usually most noticeable in the brain stem, and are more obvious in the grey than the white matter of the brain, in this case they were almost confined to the brain proper and were as great in certain parts of the white matter, such as the internal and external capsules, as in the grey matter. The greatest degree of change was seen in the head of the left caudate nucleus, but the whole of the basal ganglia, cortex, and centrum ovale were affected to some degree. The changes seen may be described under the headings of *vascular changes, small-celled infiltration*, and *changes in the nerve cells.*

*Vascular Changes.*—These were present everywhere in the brain. Many of the cortical vessels had undergone thrombosis, and in many of the larger veins the inner part of the thrombus consisted of red blood corpuscles and fibrin, whereas the outer part was a layer of leucocytes one or two cells deep. In several of the smaller vessels the thrombus consisted almost entirely of leucocytes, both polymorphonuclear and lymphocyte varieties being present. Between these cells there was a small amount of fibrin, but in most cases there was no room between the cells for this to be seen. Such leucocytic plugs were seen in the calcarine fissure (Fig. 1), over the frontal and parietal regions and less frequently in the substance of the brain, especially in the neighbourhood of the anterior perforated space. The walls of the plugged vessels did not show any gross inflammatory changes, but in the neighbourhood there was always a greater degree of small-celled infiltration than was seen elsewhere. Everywhere the blood-vessels were dilated, and the numerous distended capillaries made the brain substance appear unduly vascular. Many of these capillaries showed evidence of proliferation of their endothelial lining, and outside this there were in many places chains of small round cells which appeared to have issued through the capillary walls (Fig. 2).

*Small-celled Infiltration.*—This type was seen in varying degree all through the brain substance. It was certainly most obvious in the basal ganglia, particularly in the head of the caudate nucleus and the posterior part of the optic thalamus and the tegmentum of the mid-brain (Fig. 3). In these situations it was not uncommon to find groups of 20 or more small cells clustered together in the neighbourhood of a small arteriole or venule. They were not in the perivascular lymphatic space, but in the tissues immediately outside this. In no place could we find so great an accumulation of small cells within the perivascular lymph channels, although in a few vessels one or two cells, or at most a single ring of cells, could be seen in this situation. A very striking appearance was the collection of small cells between the fibres of the internal capsule, especially between the fibres which run across this to link together the various parts of the corpus striatum. In sections of the basal ganglia the bundles of these fibres were picked out by the unusual number of small round cells which they contained, and in many places more cells were seen in these bundles than in the grey matter surrounding them. In the internal capsule, especially in its lower part, the accumulation of small cells was fairly dense, and in relation to some of the large vessels entering from the base of the brain they were so closely packed as almost to suggest a perivascular infiltration. Here again, however, they were not within the perivascular lymph space, but in the brain tissue just outside this. The external capsule was less infiltrated than the internal, but here and there collections of as many as 20 cells were found lying closely packed between the fibres. In the cortex the increase in the number of small cells was less obvious, and in most places amounted to little more than an excessive number of glial-like nuclei. As has been already said, the infiltration was greater in the neighbourhood of vessels which were plugged with leucocytes. Everywhere the subpial layer of glia was respected and showed neither increase in the number of glial nuclei nor small-celled proliferation. In the upper part of the mid-brain, especially in the tegmental region, a slight degree of small-celled infiltration was seen. This became progressively less on passing downwards, and in the pons there was practically no alteration from the normal. It was particularly noticeable that no such cellular infiltration was seen among the bundles of the cortico-pontine and cortico-spinal fibres as was seen in the internal capsule.

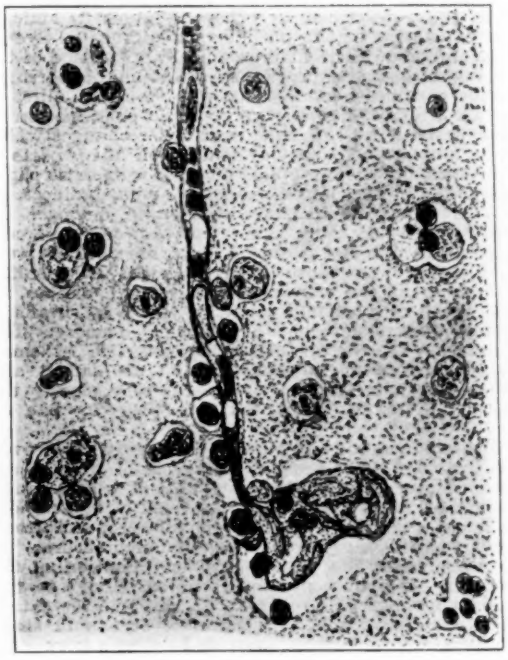
As regards the nature of the cells which had infiltrated the brain substance, they appeared to be for the most part small lymphocytes. Very few plasma cells were seen, but this might have been accounted for by the long formalin fixation, which made any selective staining of these cells impossible. There was little or no evidence of glial proliferation, and practically no large forms of glial cells were seen. Cellular infiltration was seen in a few places in the pia arachnoid and was nowhere very striking.

*Nerve Cell Changes.*—As already remarked, it was not possible to obtain satisfactory staining of the Nissl granules, but a general idea of the condition of the nerve cells could be got by staining with hæmatoxylin. The alterations in

FIG. 1.

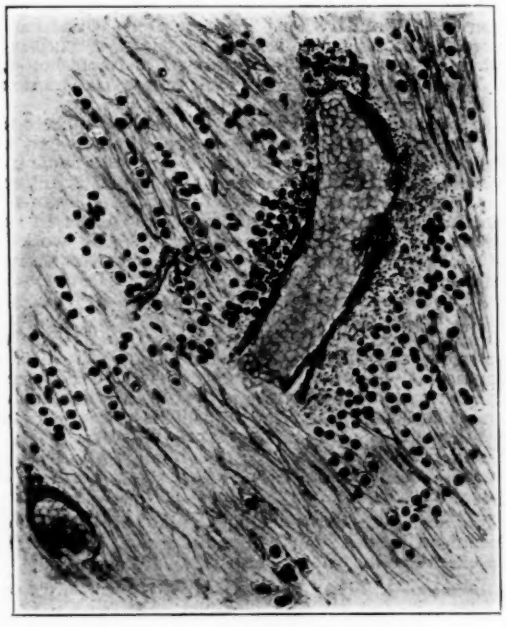
Vessels in calcarine fissure showing leucocytes. (× 150.)

FIG. 2.



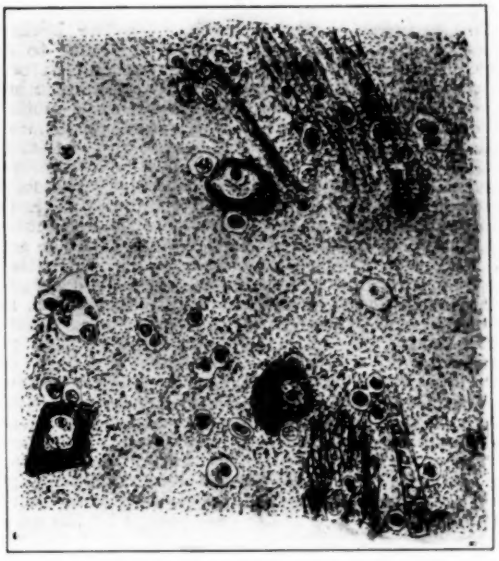
Left caudate nucleus. (× 650.)

FIG. 3.



Tegmentum of mid-brain, right side. (× 300.)

FIG. 4.



Basal ganglia, right side. (× 500.)

these cells were very irregular in incidence. For example, in one part of the ascending frontal convolution the Betz cells would be practically normal, whereas in another the majority of the cells were surrounded by small satellite cells or neuronophages. In such areas it was not uncommon to see a nerve cell completely or almost completely broken up, and represented only by a nucleus and a cluster of satellite cells. The same irregular incidence of the nerve cell degeneration was seen in the basal ganglia, in some parts of which a greater proportion of nerve cells appeared to be affected than in any sections of the cortex examined, while in other parts the nerve cells appeared practically normal (Fig. 4).

In the areas showing the greatest degree of cell degeneration a large number of small degeneration granules, which stained deeply with neutral-red, could be seen both in and around the degenerated nerve cells and in the perivascular sheaths of the vessels. In the brain stem the cells of the superior corpora quadrigemina were slightly degenerated, and a few of the cells of the substantia nigra were surrounded by rings of satellite cells. The cells of the oculo-motor nuclei, the red nucleus, the nuclei pontis, and the nucleus dentatus appeared to be perfectly normal. No micro-organisms could be found in sections stained by Gram's method, either in the meninges, cortex, or basal ganglia.

*Remarks.*

Although this case shows much slighter changes than those described by others it seems to indicate the constancy of the pathological picture in Sydenham's chorea. The macroscopical appearance of the brain was normal except for some subpial hæmorrhage in the occipital region. This was thought at first to be an artefact, but the microscopic examination of that part of the cortex showed other changes which must have occurred before death. In many parts of the brain the microscopical changes were of so slight a degree that they might easily have passed unnoticed, but although slight they were quite definite. In other places they were so great that they could scarcely have escaped observation. The sections, in fact, were very similar to those from cases of encephalitis lethargica in the earlier stages of the disease, in which the cellular infiltration of the vessel walls is either absent or is not a prominent feature. The congestion of the vessels, the emergence of small round cells from the walls of the capillaries, and the diffuse neuronophagy resemble very closely the picture of that disease as described by one of us (J. G. G.).

The epidemic of encephalitis lethargica has proved conclusively that a fatal encephalitis may occur without any but the slightest signs of cellular infiltration of the brain tissues. Several of the rapidly fatal cases in the Derby epidemic were completely negative in this respect. It should not surprise us, therefore, that the pathological examination of the brain in cases of acute fatal chorea should so frequently have given no result. In this country pathologists are accustomed to examine organs in small pieces and very thin sections, and unless a very large number of pieces and of sections are examined the changes that are present may pass unnoticed. Marie and Trétiakoff insist on this point, and say that even in their case, where the lesions were evident enough, the examination of small sections might easily have failed to detect them.

In several pathological reports on the brain in cases of chorea we have found no reference to any sections except those of the cortex, and in some only the motor cortex appears to have been examined. In our opinion negative findings by such methods of examination are absolutely valueless. There is now a sufficient body of evidence to prove that the pathological basis of chorea minor is a diffuse or disseminated encephalitis affecting chiefly the corpus striatum and involving the cortex and the pia arachnoid. It seems more than probable that the micro-organism responsible for this encephalitis is the same as that which causes the carditis and arthritis of rheumatism. The lesions have been most constantly found in the caudate nucleus and the putamen, and in our case they were most evident in these regions. Other authors have found changes of equal degree in the cortex, although there they are apt to be disseminated rather than diffuse, or at least to be much more evident in some areas than others. The incidence of these cortical lesions is very irregular, and as macroscopic sections may give one no help in choosing pieces for microscopical examination it is very easy to miss those which show the greatest changes. This probably accounts for the divergence of opinion as to the importance of the part played by the cortex in the pathological process.

This view of the pathogenesis of chorea takes little account of the presence or absence of embolism of small arteries by fragments of cardiac vegetations. The occurrence of such emboli is disputed by various authors. Whereas Guizzetti and Camisa found them in two cases, they were not found by Poynton and Holmes, nor by Marie and Trétiakoff. In our case their occurrence was doubtful. Although a few of the small arteries both in the meninges and in the substance of the brain were blocked by leucocytic thrombi it was not possible to be certain that these were pieces of cardiac vegetations. The brain tissue in their neighbourhood certainly showed a greater degree of small-celled infiltration than was present elsewhere, but it did not show any evidence of softening, and except in the case of the artery on the occipital surface of the brain there was no sign of such petechial hæmorrhages in the neighbourhood as would be caused by the sudden blocking of a vessel. In our opinion it seems more probable that these leucocytic thrombi are formed in situ in the neighbourhood of a concentration of the causative micro-organism. Thrombosis of vessels was frequently observed in our case, and where a fairly large cortical vessel was thrombosed it was common to find that the outer layers of the thrombus contained a very large number of leucocytes. By an exaggeration of such a process a smaller vessel in an infected area would become so plugged with leucocytes that the blood-flow would be arrested.

Whether embolism of small cerebral arteries occurs in chorea or not, it cannot be the cause of the disease. This is shown not only by the diffuse nature of the encephalitis present in many recorded cases but also by certain clinical facts. As was long ago shown by Ogle and by Broadbent many cases of chorea occur in which there is no disease of the cardiac valves. And chorea is never found in cases of ulcerative endocarditis in the adult in which cerebral embolism of greater or less degree is common. Nor do the symptoms of cerebral embolism correspond at all with those of chorea. And it is impossible to imagine that the symptoms produced by a destructive lesion such as embolism would yield so rapidly to treatment as those of acute chorea frequently do. Again, those who have been the subjects of attacks of chorea in childhood very rarely show any signs of damage or degeneration of the brain in later life. Their intelligence in fact is, as a rule, above the average. On the whole, then, we are entitled to assume that embolism of cerebral arteries, if and when it occurs in Sydenham's chorea, is not the cause of the typical symptoms, but may possibly cause other more lasting effects, such as the hemiparesis which not uncommonly follows the attacks.

It is not possible to be equally dogmatic as to the manner in which this encephalitis gives rise to the clinical symptoms of Sydenham's chorea, but it is interesting to remember (and this point is insisted on by Marie and Trétiakoff) that the lesions in Huntingdon's chorea are also localised in the corpus striatum and the cortex. Recent work by Wilson, the Vogts, and others on the corpus striatum has shown that choreiform movements are frequently associated with disease in this area of the brain.

Finally, we wish to disclaim any originality for our view that chorea is a meningo-encephalitis of rheumatic origin. This view was in essence advanced by Poynton and Holmes, and has been reiterated by several continental authorities. This paper has been put forward merely as one more link in the chain of evidence and in the hope that it may help towards a greater understanding of the essential nature of Sydenham's chorea.

We desire to express our thanks to Dr. Robert Hutchison for his courtesy in allowing us to publish the examination of this case.

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# AMAUROSIS IN INFANTS.[1]

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AT birth the infant possesses certain faculties, while others develop during the period of growth. The faculty of vision is among the latter, and certain components do not appear for many months. The normal infant is born into the world with a retina sensitive to light, with the beginnings of a specialised central area—macula—in the retina, as evidenced by the power of momentarily fixing a light, and with good coördinated control of eye movements in the vertical plane. After the first few weeks, usually at about the fifth week, the power of prolonged fixation has appeared, and attempts at binocular fixation can be observed. The horizontal movements of the eyes are not completely coördinated and under control until about the sixth month of life; and at this age, definite desire for binocular fixation can be demonstrated. At the end of the first year binocular vision should be well established. Binocular vision, or, in other words, the desire for fusion of the images of the two eyes, continues to develop up to the age of six. This is significant when dealing with cases of squint, in which absence of this faculty of fusion is the underlying cause, as, after the age of six, attempts to improve this faculty will fail. It has been stated that the child's real "field of vision" is largely dependent on its powers of locomotion. During the first few months the child recognises, and clutches, objects only when they are brought within its grasp. Good judgment of distance is not fully developed until the third year.

It is necessary to keep the above-mentioned features in the vision development of the infant clearly in one's mind when dealing with cases of supposed defective, or absent, sight in young children, and further to remember the usual date of appearance of other powers—holding up of the head, sitting up, &c.—which gradually make their appearance in the growing infant. It is a fairly common experience among the ophthalmic out-patients of this hospital, to have infants brought up because their parents have doubts as to whether they can see, and it is first necessary to confirm the parents' diagnosis. The infant should be taken into the dark room, and the bright light from an electric torch flashed into the eyes, from a distance of not more than 2 ft. The light should be flashed from each side and from in front of the infant. If there is sight present, momentary fixation of the light should occur. This test will eliminate the totally blind infant, but routine examination of the little patient should, of course, be carried out in all cases, and the fundus examined after dilatation with a mydriatic, for which examination, in nearly all cases, an anæsthetic will be required. In making the routine examination particular attention should be directed in the first place to the reaction of the pupils, the movements of the eyes, the presence or absence of squint or of nystagmus, the colour of the irides, and the state of refraction of the eye. It should be noted whether head-nodding or head-shaking has been observed, and inquiry should be made to ascertain whether the infant rubs its eyes. This symptom often denotes a healthy retina, but with cloudy or opaque media. The child tries, as it were, to rub away the obstruction which prevents the light from reaching the retina. The parents should be questioned as to possible consanguinity, and the family history investigated. The position of the infant in the family should be found out, and particulars as to its birth ascertained. Any serious illness, or the history of a fit, or fits, should be inquired into.

[1] Substance of a lecture delivered at the Hospital for Sick Children, Great Ormond-street.

### *Impairment of Vision with no Gross Ocular Lesion.*

Now, it is obvious that a variety of causes may be acting to produce an impairment, or absence, of sight in an infant. I do not propose in this lecture to deal with those causes in which an obvious ocular lesion is found, such as cataract, malformation of the eye, or gross retinal disease. Such cases explain themselves. Rather do I intend to deal with those cases in which no gross ocular lesion is discoverable.

It has long been recognised that apparent absence of sight in a young infant may be the first sign of future mental deficiency. It is easy to lose sight of this fact when the case is viewed from an ophthalmic aspect, but it should always be borne in mind. A considerable number of infants who are first brought up on account of their sight fall into this category. It is not, of course, possible to make the diagnosis at the first visit. The child should be watched at regular intervals, and the appearance of other powers should be looked for. For instance, the infant should be able to hold its head up by about the fourth month, and should be able to sit erect by the ninth month. If these powers are late in appearing the diagnosis will be strengthened. Delayed eruption of the teeth can be taken as further evidence of future mental deficiency. Mentally defective children, for the most part, eventually obtain some vision, and are usually able to get about by themselves. The lesion is probably cortical, as in every case which I have observed the pupils reacted well to light.

### *Partial Albinism.*

The next group of cases to which I wish to draw your attention are those cases in which there is a deficiency of pigmentation in the tunics of the eyes. Albinism is well known to be one of the commonest causes of nystagmus. Everyone is familiar with the full grade albino, but in many cases the pigment deficiency may be local, and may only occur in the retina and choroid. The iris of the new-born infant is usually blue in colour, even in those cases which eventually develop brown irides. The browning of the iris is due to the deposition of pigment, occurring in the first few months of life. The proper pigmentation of the eye, therefore, is not fully accomplished at birth; but many cases have the iris sufficiently pigmented to prevent the typical red pupil of the albino, yet there is not sufficient pigmentation of the choroid and retina to subserve good vision. It is this type of case to which I am referring. The appearance is reasonably characteristic in its ophthalmological picture. The general colour tone of the fundus is lighter and brighter than normal, and the larger choroidal vessels can be seen shown up upon the white sclerotic as a background. But it is a case for a comparison with normal—the normal infant's fundus shows a relative pigment deficiency as compared with the adult—and it is rather a matter for the expert with the ophthalmoscope to decide upon the due preponderance of this feature in any given case of amaurosis. It can be definitely stated, however, that deficient pigmentation is a cause of delayed development of fixation, and that the eventual prognosis as to sight in such cases is good.

### *Temporary Amaurosis Associated with Basal Meningitis.*

Thirdly, I would mention those cases of temporary or fleeting amaurosis which are associated, in all probability, with a basal meningitis. They are a clearly-cut group. The children affected are usually a few months old. There is the history of an illness, often quite slight, though at times more severe, which may be associated with fits, head retractions, and vomiting. Following upon this the infant's sight, which had previously been quite good, fails. This failure of sight may be only for a few days, after which it returns unimpaired, or it may be for longer. The loss of vision is in proportion to the severity of the illness. These cases of fleeting amaurosis recover

completely, and there are no signs of disease in the eyes—such as optic atrophy—to be seen subsequently.

In all probability, however, these cases are identical in origin, though differing in severity, with those cases in which blindness ensues after a somewhat similar but more severe initial illness, and in which pallor of the discs is subsequently found. It has been suggested, as an explanation of the pathology of these cases, that a basal meningitis seals temporarily the foramen of Majendie, and so causes distension of the third ventricle, which by pressing upon the optic chiasma interferes with the visual pathways.

The following cases will illustrate the conditions associated with amaurosis in infants, which I have attempted to describe in this lecture.

*Mental Deficiency.*

CASE 1.—Female infant. Was first brought up to hospital in 1906 because the parents thought that she had defective vision. She was prematurely born at the seventh month, and suffered from fits for the first two years of life. Fixation was very doubtful, and though the discs were noted as being suggestively pale, yet it was considered that there was not sufficient in the fundi to account for the defective vision.

She was seen again in February, 1914, when 9 years old. "Is an obvious idiot, does not seem to see, though on occasions appears to notice things. Can talk well but without sense. Lower limbs completely spastic, cannot sit up alone, no control of sphincters. Is quite a baby in her habits, sucks a teat, gets into severe tempers." The pupils reacted readily to light. The eyes were markedly divergent. The discs showed temporal pallor, but the fundi were normal in other respects.

She was last seen in January, 1921. "General condition much as before, idiot, spastic flexed legs, cannot walk, rolls head frequently from side to side. Eyes divergent, pupils active to light, sees light and looks towards it sometimes."

CASE 2.—Female infant, when first seen 7 months of age. Was brought up because she "took no notice." She was one of twins at the mother's sixth confinement. The other twin died from "bronchitis"; rest of family alive and well. She has had "fits of spasms and cryings" since a fortnight old. General condition seems good, but she does not yet hold her head up. Eyes parallel, no nystagmus, pupils react to light. It is difficult to obtain fixation, except occasionally with a very bright light. Media of the eyes clear, and fundi normal.

She was next seen two months later: "Did not fix the light; the fits have now ceased; can only just hold her head up; movements of the limbs appear good; is sleeping better; no teeth yet." Two months later again, aged 11 months: "Fixation is obtained with a strong stimulus. It appears to take a stronger stimulus to evoke fixation than with a normal infant. Has now cut two teeth."

CASE 3.—Female infant, aged 8 months when first seen. "Mother thinks that she does not notice things. First child, no previous miscarriages, fits for first six months; these have now ceased, good general condition, moves limbs well, eyes straight, no nystagmus, pupils react, fixation difficult to obtain, if at all. Media clear, fundi show a slight pigment deficiency." Seen two months later: "Fixation obtained more easily, occasional convergence." Seen two months later: "Mother says that the child does not seem to see as well as other children of the same age, and is backward. Cannot sit up by herself yet, no teeth, does not crawl. Will fix and follow the light, but seems slow in making up her mind to do so. It would appear that a more powerful stimulus is needed to arouse her attention."

The first case has been followed to its conclusion. Of the second and third cases this can hardly be said, but I would point out that no satisfactory lesion in the eye can be found for the defective vision, and that the initial fits, the failure to hold the head up, to sit up and to crawl, and the late appearance of the teeth, are suggestive features. Further, the manner of the fixation of the light by the eyes, when obtained, is very characteristic. These infants have a curiously languid way of performing this act.

*Pigment Deficiency.*

CASE 4.—Male infant, aged 4 months when first seen. Was brought to hospital "because he took no notice and rubbed his eyes." "Seventh child; other children alive and well and have good eyes; all are very fair, as also is the father; normal, healthy infant in other respects; eyes parallel; slow horizontal nystagmus; pupils react to light; fixation difficult to evoke, if at all; media clear, fundi show marked pigment deficiency, large choroidal vessel shown up on white sclera as background."

Seen five months later; now definitely follows objects. Mother says that he does not like bright light. Nystagmus had ceased until a few days ago when he got a bad cold, since when it has returned.

*Temporary Amaurosis.*

CASE 5.—Female child, aged 18 months. Quite well until one month ago; then "screaming convulsions," after which the child was apparently blind. Felt for its bottle and did not see it, crawled round its cot and hit its head. When seen both pupils were large and reacted very fully to light; fundi showed no abnormality. Seen again a week later: Child now sees well, pupils normal size and react to light readily.

These cases are taken from the report of an investigation, carried out at the Royal London Ophthalmic Hospital by the Lang research scholars, which appeared in the *British Journal of Ophthalmology* for August.

## BACTERIAL FOOD POISONING FROM MUTTON.

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To the medical officer of health, the pathologist, and, to a lesser degree, the general practitioner the sudden outbreaks of serious and sometimes fatal disease still commonly, but erroneously, referred to as "ptomaine poisoning" are always of great interest. Although more than one hundred such epidemics have been reported in this country, and although about 80 per cent. of these were due to flesh foods of various kinds,[1] no instance is recorded where mutton was proved to have been the food primarily responsible for the transmission of the disease. In May of this year, however, there occurred in Manchester a limited outbreak of food poisoning in which, in all probability, this relationship was present.

*Summary of Chief Features of Outbreak.*

Six separate households were affected, the number of individuals attacked being 25. Abdominal pain, vomiting, diarrhœa, and muscular cramps were present in most cases. There was often profuse sweating, and in a few cases fever and delirium were reported. One patient, D. G., aged 40, died on the third day of illness; in the other cases recovery took place after an illness of from about 24 hours to 7 or 8 days. The average period of incubation was found to have been from 17 to 20 hours.

The clinical diagnosis of bacillary food poisoning was rapidly confirmed by the isolation from the tissues and secretions of D. G.[2] of a bacillus of the food poisoning (Gaertner) group, further particulars of which are given later. Also, the blood of most of the individuals attacked agglutinated in relatively high dilution (1 : 250 in one case) both a known bacillus of the food poisoning group (*B. suipestifer*, type Mutton) and the bacillus isolated from D. G. Other organisms of the food poisoning group were agglutinated in lower dilution or not at all. Bacteriological examination of the fæces and urine from a few cases was negative.

All the individuals attacked had recently eaten some kind of meat food purchased from the same retailer. Four persons in one house became ill after eating "veal chops," but in every other case the illness followed the consumption of some form of mutton (leg, shoulder, breast of mutton; mutton chops). Six patients ate, in addition, some beef roasted in the fat in which some of the mutton was cooked. A notable negative instance was provided by the case of

[1] Savage; Food Poisoning and Food Infections, 1920.
[2] The public health authorities were first notified of this outbreak through the coroner's office.

a child aged 4 (suffering from measles) who alone, among seven inmates of one household, had no mutton and did not suffer from symptoms of food poisoning. Further evidence of a similar kind was obtained. The meat in question was said to have been of very good appearance and flavour, and in most cases to have been well cooked. In some instances it was consumed only when served hot.

The only part of this suspected food which could be obtained for examination was the remains of a leg of mutton of which nine of the persons affected had partaken. From different parts of this joint, though not from some parts, a bacillus was isolated which agreed in its cultural characters, its pathogenicity, and, so far as tested, serologically with the bacillus isolated from D. G. The carcass from which this leg of mutton was obtained was one of six bought by the retailer a few days before the commencement of the outbreak. These were imported frozen carcasses which, after passing through the hands of various dealers, were stated to have been received by the retailer in bags in a "bright, hard" condition.

A full investigation at the retail shop gave no evidence of past or present intestinal disorder amongst the butcher's family or staff nor of any other likely source of specific contamination. The only non-imported meat sold there for a month prior to the outbreak was veal from four calves bought at the Manchester meat market. These four carcasses were passed as sound, and, with the exceptions already mentioned, no cases of illness could be discovered amongst the purchasers of this veal.

*Remarks.*

Here, then, was an outbreak in which, first, the nature of the disease was ascertained beyond reasonable doubt. Secondly, the rôle of mutton as the agent responsible for the transmission of the infection, in most of the cases at any rate, was clearly indicated. Many food poisoning epidemics have been elucidated to this extent, but only rarely is it possible to determine the actual source and occasion of infection, and this outbreak is no exception to the general rule. How and when this mutton became contaminated was not shown. It is probable that the carcass was extensively infected, but it remains uncertain whether infection took place at the retailer's shop or was already present when he received the meat. In the first case, it is quite possible that the mutton became contaminated with infective agents derived from the veal. The evidence obtained, however, supported the reverse view, that the veal chops giving rise to disease were infected from the mutton.

As to the primary source of infection in this, as, indeed, in most outbreaks, nothing is known. In a few instances the dangerous state of the meat has resulted from disease in the food animal, but this explanation is contradicted in the present case by the bacteriological findings, for it may be assumed that under such circumstances all parts of the joint examined would have been uniformly invaded.

The bacillus isolated from the spleen of D. G. had the general cultural characters of the inosite fermenting food poisoning bacilli. It was not agglutinated by an enteritidis serum, and only to 125/5000 titre by a paratyphosus B serum. With a suipestifer, type Mutton, serum it was agglutinated to full titre (1 : 8800). A suipestifer, Newport, serum of titre 1 : 20,000 failed to agglutinate in low dilution. From a suipestifer, Mutton, serum the bacillus D. G. absorbed completely its own and the primary agglutinins, and, from a high power anti-serum prepared with the bacillus D. G., *B. suipestifer*, type Mutton, absorbed the agglutinins for itself and for the homologous organism in equal proportion.

In the course of these tests other facts of bacteriological interest were noted, which may be referred to at a later date elsewhere. It may, however, now be stated that the causal organism of this outbreak was a strain of *B. suipestifer* (or *aertrycke*), type Mutton, the organism most commonly responsible for food poisoning in man.

# A CASE OF SPORADIC INFECTION BY THE *BACILLUS AERTRYCKE*.

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*(From the Department of Pathology of the University.)*

SINCE the original aertrycke epidemic, described by De Nobele[1] in 1899, cases of infection by organisms similar to the one then found, with fully recorded post-mortem notes, appear to be rare. The work done by Boycott,[2] Bainbridge,[3] and H. de Morgan[4] gives us a very valuable survey of the bacteriology of the paratyphoid group, but no information is given by these investigators on the post-mortem changes due to the Aertrycke bacillus. Slight reference is made to two post-mortem cases by Perry and Tidy,[5] in which they isolated *B. aertrycke* from the gall-bladder and from the spleen in both cases. Bainbridge[6] recorded a case of *B. suipestifer* infection in which the organisms isolated never formed gas in any carbohydrate medium, and a similar strain was isolated and described by Bock.[7] The following case, in which *B. aertrycke* was isolated, is therefore of some interest.

*Clinical History.*—A boy, aged 3 years, was admitted to hospital on July 24th, 1920, with a history of suddenly becoming ill on July 17th. The symptoms complained of were diarrhœa and vomiting. On admittance the child looked pale and anæmic, and was in a state of collapse. No further history could be obtained. The child rapidly became worse and died on the same day.

*Post-Mortem.*—There were numerous petechiæ on the body surface. The lymphatic glands were enlarged generally. The various serous surfaces showed numerous petechiæ, whilst the mucous membrane of the bladder also showed the presence of numerous small hæmorrhages. The lungs showed extensive changes. Marked bronchopneumonia was present in the lower lobe of the right lung, the upper and middle lobes being distinctly œdematous. The upper lobe of the left lung was also œdematous and collapsed, the lower lobe being stretched over and adherent to the diaphragm. The spleen was found to be lying in an abscess cavity, the upper boundary of which was formed by the diaphragm. This cavity contained three-quarters of a pint of pus of café au lait colour. The upper three-quarters of the swollen spleen was necrotic and lying in pus, whilst from its anterior aspect pyogenic membrane swept forwards and upwards to complete the abscess walls. The tip of the spleen projected downwards outside the cavity and contained a white infarct. The intestines showed changes in the Peyer's patches and solitary lymph follicles, which were firm, swollen, pigmented, and somewhat worm-eaten in appearance. These solitary follicles also showed irregular depressions at their centres, the appearances suggesting a healing enteritis. Numerous white infarcts were present in the kidneys.

*Bacteriology.*—Broth cultures were obtained from the contents of the splenic pulp and from the gall-bladder. The Gram-negative actively motile bacilli isolated in pure culture from both sources gave the following cultural characteristics: A moist, white, semi-translucent growth on agar, practically odourless; uniform turbidity in broth; acid, and after some days, a faint trace of gas, in glucose, maltose, and mannite; lactose and saccharose unaffected; litmus milk, at first acid, finally and permanently alkaline; gelatin not liquefied, and no indol produced. The bacilli, when first isolated, could not be agglutinated by specific sera for *B. typhosus*, *B. paratyphosus* A, *B. paratyphosus* B, *B. enteritidis* of Gaertner, or by a weak human serum obtained from another case of aertrycke infection (strain unknown).

Repeated subcultures were made over a period of three months, during which time the organisms gave unmistakable signs of gas production in glucose, maltose, and mannite, though lactose and saccharose were still unaffected. The volume of gas formed gradually increased in the earlier successive subcultures. At this period agglutination experiments still gave negative results, but 12 months after isolation, when a series of experiments were carried out with Dreyer's technique,[8] positive results appeared. For this purpose standard killed cultures of *B. paratyphosus* A, *B. paratyphosus* B, *B. enteritidis* of

Gaertner, and *B. aertrycke* (Mutton strain) were obtained from the Standards Laboratory, Department of Pathology, University of Oxford, and standard agglutinating sera were supplied from the same source. Killed cultures of *B. paratyphosus* C, and an agglutinating rabbit serum against this organism, were also prepared from a strain obtained from Prof. C. J. Lewis, of the University of Birmingham.

The organisms obtained from the splenic pulp and gall-bladder of the case under notice were then found to be agglutinated by the specific sera for *B. paratyphosus* B, and for *B. aertrycke* in the same titre (1 in 250), but not by the specific sera for *B. paratyphosus* A, *B. enteritidis* of Gaertner, or *B. paratyphosus* C. A rabbit was then inoculated intravenously with a formalised dead culture of the strain from the splenic pulp, and its serum was found to agglutinate *B. paratyphosus* B, *B. aertrycke*, as also the strains from the splenic pulp and from the gall-bladder, in a titre of 1 in 25,000, but to have no effect on *B. paratyphosus* A, *B. enteritidis* of Gaertner, or *B. paratyphosus* C, even in a dilution of 1 in 25.

Since the two strains of bacilli which had been isolated were thus shown to possess agglutinative properties indistinguishable from those of *B. paratyphosus* B and *B. aertrycke*, as were also their respective anti-sera, it was necessary to adopt the method of "absorption of agglutinins" to establish their identity. For this purpose the serum obtained from a rabbit after inoculation of the strain from the splenic pulp was used. The experimental results are shown in the accompanying table, and prove conclusively that the two strains obtained originally from the post-mortem material are to be identified with *B. aertrycke*.

| Serum titres. | Before Absorption. | After absorption by— | | | |
|---|---|---|---|---|---|
| | | Strain from— | | *B. aertrycke.* | *B. paratyphosus* B. |
| | | Splenic pulp. | Gall-bladder. | | |
| Titre against strain— | | | | | |
| From splenic pulp .. | 1 in 25,000 | 0 | 0 | 0 | 1 in 20,000 |
| From gall-bladder .. | 1 in 25,000 | 0 | 0 | 0 | 1 in 20,000 |
| Titre against— | | | | | |
| *B. paratyphosus* B .. | 1 in 25,000 | 0 | 0 | 0 | 0 |
| *B. aertrycke* (Mutton strain). .. .. .. | 1 in 25,000 | 0 | 0 | 0 | 1 in 20,000 |

The points of particular interest about these two strains of bacilli are that they (1) at first appeared to give the biochemical tests of a *B. typhosus;* (2) gradually acquired the power of producing gas: (3) were not agglutinated on first isolation, though they were later, by the specific sera for *B. paratyphosus* B, and *B. aertrycke;* (4) had caused a large splenic abscess with necrosis of the spleen, which had given few or no symptoms until a few days before death; (5) had produced evidences of intestinal changes, a fact not agreeing with the findings in the two cases of Perry and Tidy; (6) had produced a serum which was found to contain no agglutinins after saturation with their own organisms, or *B. aertrycke*, but which still contained a considerable amount of agglutinins after saturation with *B. paratyphosus* B. This proved that in the first case the serum had been saturated by homologous organisms, which had removed from it the whole of the specific agglutinins as well as the coagglutinins. In the second case only the coagglutinins had been removed from the serum by the closely related organism (*B. paratyphosus* B).

In conclusion I wish to express my thanks to Dr. A. E. Barnes for his permission to make use of the clinical notes of this case. Also to Prof. J. Sholto C. Douglas for the many suggestions he gave me during the working out of the bacteriology of the case, and for kindly undertaking to perform the inoculation experiments.

(*Continued at foot of next column.*)

OBSERVATIONS ON

# HÆMOLYTIC STREPTOCOCCI

## IN THE FÆCES OF PATIENTS SUFFERING FROM SCARLET FEVER AND NEPHRITIS.*

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RECENT work has shown that hæmolytic streptococci of a special type are associated with scarlet fever. Evidence for this association is given in papers by Gordon (1921) and Tunnicliff (1921). Scarlet fever being a disease often associated with nephritis, such cases were investigated to see if hæmolytic streptococci were constantly present in the fæces, since if this were the case, the association might be more than a chance one, and a cause either contributory or direct of the subsequent inflammation of the kidney. Various workers have noted the frequency of hæmolytic streptococci in fæces. Oppenheim (1920), examining 323 strains of streptococci isolated from 55 stools of 15 different patients, found hæmolytic streptococci in five instances only. Dible (1921) examined 152 strains of streptococci from fæces, but found only two hæmolytic varieties. Moody and Irons (1920), on the other hand, investigating the fæces of scarlet fever cases, and examining 309 stools from 85 patients, found 22 strains of hæmolytic streptococci. Using a new method of isolating streptococci from fæces, described in a previous communication, I found hæmolytic streptococci in 11 fæces out of 52 examined (Wordley, 1921). Of these 52, 30 were obtained from normal cases from which four strains of hæmolytic streptococci were obtained. I intended at first to compare the incidence of hæmolytic streptococci in the fæces of patients in the first week of an attack of scarlet fever with that found during nephritis developing at a later stage of the disease, but could not obtain any considerable number of specimens from this latter class, as the scarlet fever was not followed by complications; the stools of patients suffering from acute nephritis not associated with scarlet fever were therefore examined for the presence of hæmolytic streptococci.

### *Methods Employed.*

The fæces, dried by the method advocated by Dudgeon, were plated on human blood-agar plates (Wordley, 1921). Colonies of streptococci showing hæmolysis were subcultured until obtained in pure culture, and then further tested as follows. Hæmolysis was tested for by inoculating a suspension of human red cells in peptone water and incubating for 24 hours. The nature of the growth on agar was noted—that is, whether the strain grew in the form of fine pin-point colonies or in larger coarse colonies. The production of acid was noted in lactose and mannite. The heat-resisting properties of the organism were investigated and its morphology studied to discover whether it grew in long chains or in a diplococcal form. In all 76 stools from 76 patients in the first week of scarlet

* The expenses of this investigation were defrayed by a grant from Mr. Louis Oppenheimer.

(*Continued from previous column.*)

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fever were examined. Hæmolytic streptococci were isolated from 24, or 27·9 per cent., of these patients. Only 10 stools from patients with scarlet fever and nephritis could be obtained; hæmolytic streptococci were obtained from three of these stools. In addition, 33 stools from 33 cases of acute nephritis were examined; hæmolytic streptococci were isolated from 16, or 48 per cent. All these 33 cases were young adults with typical acute nephritis—associated with sudden onset of œdema and albuminuria, but not at that time with scarlet fever. The patient usually attributed the disease to exposure.

From these results it appears that hæmolytic streptococci are much more frequently found in the stools of patients with scarlet fever, and still more frequently found in cases with acute nephritis. In the majority of cases examined, colonies of hæmolytic streptococci were numerous and evenly scattered over the whole surface of the blood-agar plate; more rarely a few (six to eight), and occasionally only one or two, such colonies were present. The proportions are as follows:—Hæmolytic streptococci: numerous, 26; a few present, 10; one or two present, 4.

Any case showing one hæmolytic colony is included in the cases yielding hæmolytic streptococci. When possible three colonies were picked from each plate and subjected to further examination; as a rule each colony from the same plate showed exactly similar properties. In four instances only strains isolated from the same stool showed different secondary characteristics. An abundant growth of non-hæmolytic streptococci was obtained from every stool investigated. Dible, in the communication already referred to, showed that fæcal streptococci could be grouped into two main divisions: (1) a mannite fermenting strain, diplococcal in form and resistant to heat, growing in coarse colonies; and (2) a non-mannite fermenting strain growing as fine colonies, sensitive to heat, and forming long chains. Using these differences as a basis for classification, the hæmolytic streptococci isolated during the present investigation can be divided up as follows. The total number of hæmolytic strains studied was 41.

TABLE I.

| | |
|---|---|
| (*a*) Hæmolytic strains showing long chain formation | 19 |
| (*b*) Hæmolytic streptococci diplococcal in form .. | 22 |

Of these 41 strains, the greater number fell into Dible's two main groups, as is shown in Table II.

TABLE II.

| | |
|---|---|
| 1. Hæmolytic streptococci diplococcal in form, with coarse colony formation producing acid in mannite and resistant to heat .. .. | 19 |
| 2. Hæmolytic streptococci in fine colonies with long chain formation, not changing mannite, and sensitive to heat .. .. .. .. | 17 |

Giving a total of 36 out of the 41 hæmolytic strains studied falling into these two groups.

The difference between group (*b*) of Table I. and group 2 of Table II. was filled by a type that reacted as follows, that is a type producing no change in mannite, diplococcal in form, with fine colonies, and sensitive to heat. All these 41 hæmolytic strains with one exception produced acid in lactose. The power of producing hæmolysis in a suspension of human red cells in peptone water appears to remain constant after repeated subculture. Several strains six months after first isolation kept this property unimpaired.

With regard to the pathogenicity of hæmolytic streptococci to rabbits, Tongs (1921) injected rabbits with varying doses of such organisms. With large doses he produced septicæmia and death, with smaller doses severe anæmia. He makes no mention of kidney lesions. During the progress of this work rabbits were injected intravenously with varying doses of fresh cultures of hæmolytic fæcal streptococci. Beyond, when large doses were used, a transitory loss of appetite and a little loss of weight no ill-effects were noted. Post-mortem examinations showed no lesions, and microscopical examinations of the kidneys showed nothing abnormal. In addition rabbits were given a daily feed of carrots soaked in a thick emulsion of the various strains isolated without producing any ill-effects, a result previously noted by Davis (1920) when investigating the fate of hæmolytic fæcal streptococci in the intestinal canal of rabbits.

*Conclusions.*

Hæmolytic streptococci are more abundant in the fæces from cases of scarlet fever and from cases of nephritis, whether associated with scarlet fever or not, than in the fæces of normal patients. The type of hæmolytic streptococci isolated from the fæces of such cases is not a uniform one. Such streptococci appear to be non-pathogenic to rabbits.

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# ON ERRORS OF REFRACTION IN HYPERTHYROIDISM.

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THE frequent association of ocular signs and symptoms with hyperthyroidism naturally raises the question of the refractive condition. The prevalent opinion that there are no refractive changes in hyperthyroidism is no doubt due to the fact that vision is usually good in this condition. Yet one would expect changes in the refractive condition to be associated with at least those cases of hyperthyroidism that show exophthalmos. For whatever may be the cause of the protrusion of the eye, the latter no longer rests in its natural bed. The balanced pressure to which it was formerly subjected cannot but be disturbed, and it is only natural that changes in the contour of the eye should take place. One would therefore expect a change from an emmetropic into an ametropic eye, or the modification of a previously existing error.

*A Series of Twenty Cases.*

I have examined 20 cases of hyperthyroidism, 16 of whom had exophthalmos of varying degree. Of these 16 (32 eyes) the distribution of errors was as follows: hypermetropia, 1; hypermetropic astigmatism: simple 1, compound 13; myopia, 2; myopic astigmatism: simple 7, compound 5; mixed astigmatism, 3.

Thus 29 out of 32 eyes were astigmatic; of these 14 were H.A. and 12 M.A. The presence of astigmatism is therefore in a higher percentage than that normally present; and M.A. bears a greater proportion to H.A. than is usual.

Of the 4 cases (8 eyes) of hyperthyroidism without exophthalmos the distribution was: compound hypermetropic astigmatism, 6; compound myopic astigmatism, 1; myopia, 1.

In all these cases the axis of the astigmatism does not seem to follow a certain course, as one would expect if it were due to pressure of the lids on the protruding eyeball. Furthermore, it is present in 7 out of 8 eyes where there was no exophthalmos. So that whilst it is justifiable to conclude that hyperthyroidism causes astigmatism—the presence of this error in 36 out of 40 eyes can hardly be accidental—one cannot say as yet whether the astigmatism is a general manifestation or is caused by the changed local conditions.

The amount of astigmatism present is small. Out of the 36 astigmatic eyes 30 were $\pm$ 1 or under. The 3 remaining patients with larger amounts of astigmatism had come to the ophthalmic department of

the Leeds General Infirmary on their own accord for defective vision and headaches, in contradistinction to all the others but two, who had to be collected from the medical department for the purpose of examination. Vision was good in all but the three cases with the higher astigmatism.

Apart from the almost constantly present astigmatism, the frequency of myopia in the figures quoted is striking, but it will require a greater number of cases before a generalisation can be made on this point. Incidentally it may throw light on the ætiology of refractive errors.

*Hyperthyroidism and Headache.*

The almost constant presence of astigmatism in the hyperthyroid state would lead one to expect that these patients should suffer from headaches. And this is, indeed, the case. Out of the 16 patients with exophthalmic goitre, 13 suffered in this respect. Out of the 4 hyperthyroid patients, 3 were subject to headaches. Moreover, all the patients who had their astigmatism corrected reported the disappearance of this symptom. And more than this, many patients stated that they feel much better generally since wearing glasses. It is quite conceivable that much good can follow the correction of astigmatism in patients whose nervous system is unstable, as it is in hyperthyroidism. This would be so, irrespective whether the hyperthyroidism caused the astigmatism, or whether the symptoms of a pre-existing astigmatism were merely brought out by the hyperthyroidism.

In most cases the history of headaches given corresponded closely with the history of the disease. One patient, though always more or less subject to headaches, had suffered more intensely and more frequently since the appearance of the goitre. Another had headaches only since the appearance of hyperthyroidism. In both cases the symptoms disappeared and the general condition markedly improved under appropriate cylinders. Correction of refractive errors materially assists medical treatment of many disturbances. Hyperthyroidism is an affection difficult of treatment. It is therefore all the more important that the almost constantly associated astigmatism should be corrected.

Mr. Harry Lee, ophthalmic surgeon to the Leeds General Infirmary, tells me that he has recently seen three cases of exophthalmic goitre. One had hypermetropic astigmatism and the two others myopic astigmatism. These results are in general agreement with the above. Some of the retinoscopic examinations of the above-mentioned cases were made by Mr. Lee, to whom I am indebted for permission to publish his cases, and for much kind encouragement and advice.

I must also acknowledge my indebtedness to Mr. A. L. Whitehead, senior ophthalmic surgeon, for permission to include in this publication a case under his care.

# A CASE OF MULTIPLE PANCREATIC CALCULI:

## REMOVAL AND RECOVERY.

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A SEARCH into the British and American literature on the subject of pancreatic calculi reveals the fact that cases of this type are not numerous, although the condition has been known since 1667. Einhorn[1] in 1915 found that the largest series of collected cases was that of Zesas, who investigated 70 records; in many of these the calculi were found at autopsy, in some the diagnosis was made of chronic pancreatitis of probable calculous origin. Cases of operative removal have been recorded by Moynihan,[2] Pearce Gould,[3] L. W. Allen,[4] and Murray.[5]

*History.*—A railway guard, aged 29, was admitted to the London Hospital on August 23rd, 1921, for investigation of a peculiar type of upper abdominal pain. He had suffered for 15 years, ever since he left school, from attacks of pain in the epigastrium, colicky in type and lasting for variable periods from two days to a week. No history could be elicited of any abdominal trouble or acute illness preceding the onset of these attacks. He described the pain as if "something were trying to move in the upper part of his stomach." It was mainly in the mid-line but moved towards the left, and became markedly worse about a quarter of an hour after taking food, but no vomiting had ever occurred. The pain had occasionally wakened him at night during an attack. (Considering the usual wide radiation of pain in colic of other sources, these attacks were remarkable for their localisation to the mid-line of the epigastrium.)

For two years the attacks had been more frequent and severe, and slight but continuous wasting had been noticed. The appetite was good, although checked by the increased pain after food. There had never been jaundice or undue flatulence, and no change in the stools was observed.

*Condition on Admission.*—The patient was a well-built man, but rather pallid with irregular areas of pigmentation on his face, neck, and chest. The mouth and teeth were in good order. Examination of the abdomen revealed nothing abnormal. The urine on admission showed no signs of sugar or albumin. Test-meal showed free HCl 0·05 and total acidity 40. Barium X ray examination with the screen demonstrated an irregularity on the lesser curve, but unfortunately the coil in temporary use was small, and the appearances suggested a penetrating ulcer of the lesser curve. A film was taken later obliquely across the abdomen, and proved that the shadows were outside the stomach.

*Operation.*—Laparotomy was performed on the 26th, the abdomen being opened by an incision one inch to the right of the median line, with displacement of the rectus muscle. Examination of the stomach, duodenum, and gall-bladder revealed nothing abnormal. A hard mass, felt on the posterior wall of the abdomen, proved to be the pancreas filled with calculi which, on gentle pressure, produced a soft grating sensation.

Taking the easiest method of access as suggested by Moynihan,[6] the gastro-hepatic omentum was incised, the pancreas laid bare, and an incision made over the most prominent of these masses. A quantity of pancreatic fluid escaped, dark-coloured and rendered turbid by the presence of small sandy particles. The duct was opened up, and stones removed from the whole length together with small offshoots in the secondary ducts. Six large stones were removed, averaging ¾ in. by ½ in., the largest being a round-ended stone apparently filling the duct at its entry into the duodenum. The ducts throughout were dilated, the walls thickened, and the gland tissue relatively thinned out. A small tube was inserted into the duct, which was re-sutured throughout its length with plain catgut. The tube was drawn out through a stab incision in the left rectus.

*Course of Case.*—Progress was uninterrupted; 8 oz. of a dark rather viscid fluid drained from the tube in the first 48 hours, 2 oz. in the next 48 hours, and the tube was removed on the sixth day. Flatulence was rather distressing for the first two days; appetite was late in being restored, but otherwise convalescence was uneventful and the patient left hospital on the nineteenth day.

The calculi, which were pale in colour and studded like coral, were found on analysis to consist of calcium carbonate with an insignificant admixture of oxalate both of calcium and magnesium. Dowd[7] has recorded cholesterol stones in the pancreas. The fluid drawn from the pancreas was examined and found to digest starch rapidly, protein slowly in alkaline solution, but not at all in acid solution. The digestion of fat was extremely slow. Repeated cultures failed to demonstrate any bacteria in the fluid. The diastatic index examined on the fourth day was 10. The patient was seen again on Jan. 22nd, 1922; he had put on weight to the extent of 1½ st. and was quite free from symptoms.

*Remarks.*

A reference to the cases recorded shows that pancreatic calculi in their symptomatology fall into line with calculi elsewhere. The first group, in which this case finds its place, presents the symptoms of intermittent obstruction without gross infection; the evidence of injury to the gland is slight, being manifested only in slight wasting. In the second group of the type of cases recorded by Atkinson and Hirsh[8] the disorganisation of the gland proceeds till its disordered function is evidenced in glycosuria, pancreatic stools, persistent dyspepsia, and in some cases interference with the bile-ducts.

I am much indebted to Dr. G. E. Vilvandré of the radiological department and to Dr. J. R. Marrack of the clinical laboratory of the London Hospital for their investigations.

(*Continued at foot of next page.*)

# Reviews and Notices of Books.

## A PRIMER OF PSYCHOTHERAPY.

*Outwitting our Nerves.* By JOSEPHINE A. JACKSON, M.D., and HELEN M. SALISBURY. London: Kegan Paul. 1922. Pp. 403. 7*s.* 6*d.*

THE title of this book, and the publisher's eulogy borne on the wrapper, aroused the suspicion that here was another popular exposition of Freudism written to catch the market. But that did injustice to a delightful work, full of cheery dogmatism mingled with shrewd but kindly blows at the failings of the neurotic patient, whom Dr. Jackson hustles back to health by methods not always dependent upon abstruse principles. Of a patient with a pseudo-cyesis she writes, "I gave her a punch or two and told her to go and dress for luncheon"; and her handling of hysterical vomiting may be learnt from the remark that, "I have had patients throw up one meal, and very rarely two, but I have never had to supply more than three meals at a time. The waste of food I consider amply justified by the benefit to the patient." One pictures her patients overwhelmed by this whirlwind of an American lady doctor (the share of her collaborator is not clear) who spares no idols. Rest cures, toxins, fatigue, nerves, and diets are all swept away, and who knows how much surgery falls before the blast when she writes of "the poor neurotic, who insists that the surgeon shall remove her appendix, her gall-bladder, her genital organs, and her tonsils, and who finally comes back that he may have a whack at the operation scar"?

When the reader has recovered his breath he must go through the book again to grasp what the lady has to teach. First (p. 11) she turns upon "nervous prostration, neurasthenia, neuroses, nervousness, and 'nerves,'" which are "good enough as figures of speech, so long as we are not fooled by them." "The nerves of the most confirmed neurotic are perfectly healthy," and "it is behaviour and not tissue that is at fault." As to this one may object that there are certain conditions for which "neurosis" is a useful name. It is obvious that the authors reject Freud's differentiation of the "actual neuroses"; it is good, however, to have the psychological view thus vigorously presented. Yet it is surprising to find on the next page that insanity is a physical disease arising from changes or toxins in the brain cells. One suspects that the glib and convincing statements Dr. Jackson gives her patients have sometimes crept into the book and are not always to be taken as matured opinions; the confident statement about insanity would reassure a fearful patient, but less iconoclastic writers than Dr. Jackson reject the hypothesis of a physical cause of such a condition as paranoia, for example, in favour of a mental one.

Under the title "How the wheels go round" is given, in lively style, an account of psycho-analysis which shirks nothing but should offend no reasonable person. It would be well if adherents of Freud kept to his nomenclature and avoided the word "subconscious." That "a resistance is a chronic repression" is not quite true, and though suggestion is handled reasonably well along ordinary lines yet the author misses a point when she writes (p. 129), "At the base of every psycho-neurosis is an unhealthy suggestion. This is never the ultimate cause. But the suggestion is the material out of which those other forces weave the neurosis." She might have shown that a particular suggestion produces a symptom because there already exists a hidden desire with which the suggestion is in accord; this is the key to the psycho-analytic theory of suggestion. Practical chapters on "dietary taboos" and "the bugaboo of constipation" are full of outspoken advice to give our internal organs a chance. "The colon is not a cesspool but a digestive and assimilating organ" sounds like heresy nowadays, but perhaps the startling idea is true. It is strange that although the writers ascribe flat-foot to neurotic flabbiness, yet the relation of abdominal ptosis to "functional disturbance," whether as cause or effect, is denied. The mixture of methods used in treatment may be summed up in the authors' words (p. 276): "Psycho-analysis often reveals the source of the trouble, and a little bullying helps along the good work." This prompts the criticism that the analyses often appear superficial; the preponderance of hysterical symptoms in the patients treated suggests that in other conditions—the pure obsessional states, for example—the methods used may not be so successful.

The merits of the book consist in its readable style and the combination of theory with abundant clinical examples. The practitioner who reads it will be helped to recognise the nature of many symptoms and may find courage to treat them along the lines indicated by the writers; he will also find that the racy style in no way detracts from the serious purpose of the book.

## ANATOMY.

*Manuel d'anatomie humaine.* Second edition. By GEORGES GÉRARD. Paris: Masson et Cie. 1921. Pp. 1280. Fr.75.

THE second edition of this well-known standard French text-book appears as before in one volume, but has otherwise been carefully revised and brought up to date. The arrangement of descriptive material differs somewhat from that usually adopted in our text-books. The clarity and conciseness of description are marked features of the work, which is copiously illustrated. The figures are clear and useful, and we notice that extensive use has been made of Farabœuf's striking drawings. To turn now to some of the more recent features in the volume, we observe that the account given of the formation of the incisive region of the upper jaw does not correspond with that generally accepted in this country; congenital anomalies of the heart and large vessels are grouped into a couple of very useful tables for reference; the account of the rotation of the intestine and evolution of the definitive peritoneal cavity appears to be founded on the old descriptions which are not accurate in all their details. There is a very full and up-to-date account of the renal circulation. Bearing on this last subject, it may be mentioned that Prof. Gérard has an interesting and useful hypothesis concerning certain lateral segmental arteries, an hypothesis which does not lose its value because one must, from the point of view of human ontogeny, look on it as transcendental.

The manual has a certain agreeable freshness for the English reader inasmuch as French anatomists seem to look on their subject from a standpoint differing somewhat from that of their English confrères. There can be no doubt that this work thoroughly deserves the high opinion of it entertained in France and elsewhere.

*Schultze's Atlas der topographischen und angewandten Anatomie.* Third edition. By WILHELM LUBOSCH, Professor der Anatomie in Würzburg. Lehmanns Medizinische Atlanten. Munich: J. F. Lehmanns Verlag. 1922. Pp. 338. 25*s.*

IN his introduction to the first edition of this well-known work Prof. Schultze quoted the advice he was in the habit of giving to the younger generation in medicine—"Denke anatomisch, wenn du ein Arzt werden willst"—and this most excellent advice is worth repeating again and again in these days of test-tubes and bacteriological progress. Twenty years have elapsed since the first edition saw the light, and the

(*Continued from previous page.*)

*References.*—1. Einhorn: Med. Rec., N.Y., October, 1915. 2. Moynihan: THE LANCET, 1902, ii., 355. 3. Pearce Gould: Brit. Med. Jour., 1898, ii., 1816. 4. Allen, L. W.: Med. Times, San. Frans., 1903, vol. xvii., p. 133. 5. Murray: Proc. Roy. Soc. Med., 1911, v. Surg., p. 131. 6. Moynihan: Abd. Operations, vol. ii., p. 442. 7. Dowd: Ann. Surg., 1915, lxii., p. 351. 8. Atkinson and Hirsh: Amer. Jour. Med. Sci., 1907, p. 54.

work has grown considerably in the interval. The anatomical descriptions are clear and accurate, if short, and the book is full of information. The sections on applied anatomy are no better and no worse than they are in our text-books; the ideal applied anatomy, seen from the clinical side, has yet to be written. This book, however, claims primarily to be an atlas, and its transcendent feature is the large number of beautiful illustrations that it contains. It is impossible to praise too highly these drawings, many of which might with justice be termed exquisite. All those concerned in the production of this third edition deserve congratulation on its appearance.

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THE DISEASES OF CHILDREN:

*Medical and Surgical.* Sixth edition. By the late HENRY ASHBY, M.D., F.R.C.P., and the late G. A. WRIGHT, M.B., F.R.C.S. Revised by HUGH T. ASHBY, M.D., M.R.C.P. Lond., Hon. Physician to the Manchester Children's Hospital; and CHARLES ROBERTS, M.B., F.R.C.S., Hon. Consulting Surgeon to the Manchester Children's Hospital. Oxford Medical Publications. London: Henry Frowde, Hodder and Stoughton. 1922. Pp. 769. £2 2*s.*

FEW tasks present greater difficulties than does the revision of a standard text-book such as Ashby and Wright's "Diseases of Children." The advancement of knowledge necessitates so much re-writing that exigencies of space involve the sacrifice of much that appeared in the original volume. In the present volume the common systemic diseases of children are fully described, and there is adequate mention of such subjects as the specific fevers, congenital anatomical defects, the teeth in childhood, and the common effects of injuries. But in a book of this size the chapter which deals with jaundice might have contained some reference to the acholuric variety, especially as acute yellow atrophy is discussed. The section on encephalitis lethargica would gain in interest by more detail of the history, pathology, and after-results of a condition on which much recent work has been done. The brief mention of the modern treatment of diabetes on p. 522 makes the prior description of its treatment less pertinent save from the historical point of view, and in general it may be said that the writers have shown conservatism towards recent advances in pathology, an attitude which makes their whole-hearted acceptance of the vitamin theory of rickets rather surprising.

The present volume contains many beautiful reproductions of radiograms and photographs, which in future editions might still further replace the old woodcuts, whose purpose has been served.

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VENEREAL DISEASES.

*Atlas of Syphilis.* By Prof. LEO v. ZUMBUSCH, Munich. London: John Bale, Sons and Danielsson, Ltd. 1922. 30*s.*

THIS atlas is a new departure in pictorial medicine. The illustrations, of which there are 63 in all, are taken by a process of colour photography direct from the patient. The result is good, the reproductions being strikingly true to life in their colouring. A series of pictures taken in this way from type cases should greatly assist practitioners who have not at command clinical material such as the specialist has; but since of necessity only types are shown, the atlas requires to be used in conjunction with a good text-book or for reference. The limitations of this book are simply the self-imposed limitations of atlases in general. It constitutes a great advance on any previous achievement, and should be a boon to students and practitioners.

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*Die Syphilitischen Erkrankungen in der Allgemeinpraxis.* Edited by PAUL MULZER. Munich: J. F. Lehmanns Verlag. 1922. Pp. 366. 10*s.*

THIS book, edited by Prof. Mulzer, who also contributes the general chapter, is the result of collaboration by eight medical men in Munich, each writing a chapter on his own department of the subject, the groundwork being a series of clinical lectures to students and practitioners. The work holds a unique position in that it goes over the whole subject of syphilis in a reasonable compass, and the authors have withstood the temptation to make it more than a concise handbook. The editor's chapter, while it is unduly optimistic of results, reveals a fine knowledge of modern treatment. His exposition of the value to be placed on the results of the Wassermann test is especially good. Noteworthy is the absence of any considerable discussion of misadventures due to salvarsan, beyond one passing reference to toxic jaundice. Possibly this is due to the infrequency of such sequelæ in Germany. The chapter on congenital and antenatal syphilis gives a good survey of a difficult subject. The volume is of convenient size, and the diction for the most part is concise and readable.

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*A Text-book on Gonorrhœa and its Complications.* Third edition. By Dr. GEORGES LUYS, Paris. Translated and edited by ARTHUR FOERSTER, Capt. R.A.M.C. (T.C.), M.R.C.S., L.R.C.P. Lond., late Resident Medical Officer, London Lock Hospital. London: Baillière, Tindall and Cox. 1922. Pp. 400. 21*s.*

A NEW edition will be welcome of a work already well known and valued by workers in this branch of medicine. By its insistence on treatment of gonorrhœa and its complications by modern methods, and especially by its advocacy of the use of the urethroscope, Luys's work has done much to put an end to the old haphazard methods of treatment, and to elevate this branch to a scientific level. If his prognosis is optimistic, this may be put down to the author's enthusiasm for his subject and to the fact that his control of patients may be better than is the usual lot of the venereal disease specialist. The changes in the present edition are in the direction of improved methods of treatment. New views are set forth on the anatomical structure and appearance of verumontamum and ejaculatory ducts which should be valuable. The translation is moderately successful, and the book is one which every specialist in gonorrhœa should study thoroughly and keep by him. It is an excellent work on a difficult subject.

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*Geschlechts-Krankheiten.* By Dr. ROBERT OTTO STEIN. With 32 coloured lithographs by Drs. KARL HENNING and THEODOR HENNING, and 15 illustrations in the text. Munich: J. F. Lehmanns Verlag. 1922. Pp. 192. 12*s.* 6*d.*

THIS book is a handbook of sexual diseases depending largely on its profuse and excellent illustrations. In addition to syphilis, gonorrhœa, and soft sore, which are the generally understood venereal or sex diseases, the writer has included in his book all the other ailments incidental to the external genitals, such as balanitis, paraphimosis, genital herpes, pediculosis pubis, and so forth. In this he has added to the value of the work, as, being really master of his subject, he has written well on common but neglected minor ailments. The coloured plates, of which there are 32, are from 74 casts prepared by Dr. Henning, and are excellently done. The book may be confidently recommended as a good dissertation within well defined limits.

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PROTEINS AND THE THEORY OF COLLOIDAL BEHAVIOUR. By JACQUES LOEB, Member of the Rockefeller Institute for Medical Research. New York: McGraw-Hill Book Company. 1922. Pp. 292. 15*s.*

SINCE the separation of substances into colloids and crystalloids by Graham, chemists have been impressed with the difference in properties of these two physical states, and it is not surprising that they thought it impossible for them to be governed by the same set of physico-chemical laws. When investiga-

tions of the colloidal properties, such as chemical combining power and adsorption, proved that no simple mathematical relations existed, a new branch of study, "Colloid Chemistry," began to evolve. Thus, in order to explain why colloids do not combine with acids and alkalies according to the usual conceptions of basicity, it was held that colloids act more in virtue of their surface area, rather than their chemical grouping. This theory was expressed mathematically by Freundrich's adsorption formula, which was found to be true within certain limits. Gradually more laws and complex mathematical interpretations were advanced, until colloidal chemistry grew into an extremely intricate specialty.

Dr. Loeb, in this book, which includes the results of several years' work and short publications in America, attacks the view that colloids and crystalloids are governed by two entirely different sets of physico-chemical laws. He states that Dr. Donnan's work on membrane equilibrium formed the basis of the views expressed in the present volume, and that practically all colloidal properties have been brought into harmony with it. Stated briefly, Dr. Loeb's view is that colloids combine with acids or alkalies according to the laws of crystalloid chemistry, provided that the hydrogen-ion concentration of the medium is kept constant. It was neglect of this factor which caused the simple stoichiometrical laws to be thought inapplicable to colloids. A very large number of experiments are described proving that providing the H-ion concentration factor is taken into account, the laws governing the combining powers of crystalloids and colloids are one.

The reader will welcome this clear exposition by Dr. Loeb of his experiments and views, the influence of which is bound to be great, for, as the author states in his concluding sentence, "If Donnan's theory of membrane equilibrium furnishes the mathematical and quantitative basis for a theory of colloidal behaviour of the proteins, as the writer believes it does, it may be predicted that this theory will become one of the foundations on which modern physiology will have to rest." Had the writer laid more emphasis on the relation of his work to physiological and pathological problems, the volume would have gained in interest for the purely medical reader

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METHODS AND EXPERIMENTS IN MENTAL TESTS.

By C. A. RICHARDSON, M.A. Cantab., Author of "The Simplex Group Intelligence Scale." London: George G. Harrap and Co., Ltd. 1922. Pp. 94. 3*s.* 6*d.*

THE object of the investigations of which this book is a record has been to determine how far certain scales of mental tests, individual and group, fulfil their avowed purpose as measures of a child's educability. The mental ages and intelligence quotients of a group of children tested by the "Stanford" individual scale were compared with the results of a composition exercise and a paper in problem arithmetic (Ballard's), for which norms of performance at different ages had been previously worked out.

The selection of two subjects generally recognised as the best scholastic tests of intelligence is perhaps open to criticism, as likely to give a higher correlation with an intelligence scale than "general educability." But the correlation obtained—0·9—is almost startlingly high, and suggests a lurking fallacy. School success depends not merely upon intelligence, but also to quite a considerable extent upon physical, home, and social conditions, and on qualities of character, and so high a figure indicates that the scores of the Stanford scale are also dependent in no small degree upon similar conditions. Mr. C. Burt has recently shown how small a part intelligence plays in the results of his revised Binet scale, and while it seems probable that the Stanford revision is more valuable in probing native capacities, Mr. Richardson's assertion that intelligence tests are "directed to the estimation of a child's natural gifts, independently of such influences as home and school environment and the effects of good and bad teaching," cannot be accepted as true of the Stanford or any other existing scale—only of some ideal scale, perhaps unattainable. He obtains a similar high correlation with a group scale—presumably his own "Simplex" scale. Allowing, however, for the above and other possible fallacies, he appears to be justified in his conclusion that these scales are fairly reliable indices of a child's educational capabilities. In a useful chapter he works out a formula for the derivation of mental ages from scores in the Terman group tests—a formula which with necessary alterations could be made applicable to all point-scales. He also deals very capably with the difficulties of calculating I.Q.'s in the case of adults and adolescents, created by the retardation of growth of intelligence after 14½ and its ultimate stoppage at 17, taking the Otis group tests and the Stanford individual scale as examples.

The book is free from technical detail beyond the simplest necessary for the author's purpose, and valuable to all who wish to be more than routine examiners. Further investigations on similar lines and covering a larger number of children are desirable.

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*The Simplex Group Intelligence Scale.* Prepared by C. A. RICHARDSON. Same publishers as above. 3*s.*

THIS "simplex scale," while on the whole resembling other group scales, embodies a few new ideas, and the author claims that it can be applied to children over a wide range of ages and abilities, and that it tests the level of intelligence from many sides may be admitted.

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DIGESTIVE DISTURBANCES.

*Diagnostic et Traitement des Affections du Tube Digestif.* By A. FLORAND, Médecin de l'Hôpital Lariboisière, and A. L. GIRAULT, Attaché médical à la clinique de thérapeutique chirurgicale de la Faculté de Médecine. Paris: Masson et Cie. 1922. Pp. 410. Fr.18.

THIS volume gives a clear and condensed account of the principal diseases of the alimentary canal; it is written essentially from the clinical standpoint, and should be valuable to the practitioner in this country who wishes rapidly to discover the point of view of leading French gastro-enterologists. The book is illustrated with tracings from radiograms, with drawings of intestinal parasites, and with reproductions of photographs of abnormalities observed by the œsophagoscope and other instruments, the whole forming a volume which once more proves what valuable books are placed before the foreign student at a cost far below those current in this country.

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## JOURNALS.

TROPICAL DISEASES BULLETIN.—In the August number J. H. Tull Walsh gives in a short digest a useful account of recent progress in the ætiology, pathology, and treatment of plague.—C. M. Wenyon summarises some 21 papers on kala azar and cutaneous leishmaniasis; relapsing fever, infectious jaundice and yellow fever are dealt with by the same authority, while summaries of certain important communications in Spanish, which on the whole confirm Noguchi's conclusions on leptospira infections, have been translated by H. H. Scott.—Clayton Lane is responsible for summaries of 57 papers on malaria, and Leonard Rogers for the section on leprosy.—Graham Little writes on tropical dermatology, while there are a number of miscellaneous papers of general interest summarised by A. G. Bagshawe and A. Alcock.—The terminal section deals with reviews and notices: here are reviews of a recent work by Phisalix on animal venoms, Rodenhuis—a manual for investigating protozoa in human fæces, Ravaut on syphilis, malaria, and amœbiasis, and Epps upon the life of the late Anderson Stuart. This number fully maintains the high standard of its predecessors, and will be of special service to compilers of text-books.

# BRITISH MEDICAL ASSOCIATION.

## ANNUAL MEETING AT GLASGOW.

(*Continued from p. 572.*)

## SECTION OF INDUSTRIAL DISEASES AND FORENSIC MEDICINE.

WEDNESDAY, JULY 26TH.

BEFORE commencing the session of this section, members were conducted over the extensive building known as the Forensic Medicine Department, and had the opportunity of seeing the complete facilities provided for research and practical teaching. The President, Prof. J. GLAISTER, then delivered the opening address on the

*Workmen's Compensation Act,*

with special reference to industrial diseases. The incongruity of combining in one section the subjects of forensic medicine and industrial diseases at once disappeared, Prof. Glaister explained, when one remembered that forensic medicine was the application of the science of medicine to the purposes of the law, and that probably no Act of Parliament had ever given rise to so much litigation as the Workmen's Compensation Acts, which provided for compensation in cases of scheduled industrial diseases, as well as in cases of accidents at factories. The interweaving of interests and the extent to which the general community was directly affected seemed to some to be sufficiently urgent reasons for grouping the entire subject under the title of State Medicine, including such sub-titles as National Health Insurance, Public Health Law, &c., but to the speaker the time did not at present seem ripe for such a general inclusion, although he considered that the medical student should have a fuller working knowledge of the main features of all branches which concerned or might concern his future professional work. Speaking from an experience of over 40 years' work as a teacher of forensic medicine and from a nearly like period as a medico-legal expert engaged in Crown work, he had to confess that the importance of the subject to the average practitioner was not generally recognised. One could not avoid the conclusion, moreover, that not a little litigation, especially as exhibited in medical evidence, could be avoided by a better acquaintance with forensic medicine.

The President proceeded to review the history of compensation to workmen in this country, commencing with the Employers' Liability Act of 1880, which modified the Common Law rules to the workmen's interest. In 1897 the first Workmen's Compensation Act was passed, which established in law for the first time the principle that the employer's liability to pay compensation to an injured workman or his dependents was quite apart from the question whether or not there had been negligence on the part of the employee or of any fellow workman. The Act of 1906 codified and extended the Acts of 1897 and 1900, and for the first time brought industrial diseases within the scope of compensation. At this time (1906) there was no provision in the United States for compensation to workmen, by means of legislation, but by 1920, 42 States had compensation laws in operation.

The President gave instructive figures, showing the cost of compensation in various industries in different years. The average annual charge per head for compensation in the combined groups of industries was 14*s.* 4*d.* in 1920, the groups showing figures ranging from 37*s.* 3*d.* in mines to 9*s.* 3*d.* in factories. Reference was made to the Mutual Association of Employers in the refractory industries (mining and quarrying ganister rock) in which the employers pooled their responsibilities and finances in the matter of compensation payments. Prof. Glaister urged the necessity of a scheme for surgical and medical services to facilitate the recovery of injured workmen, and endorsed the findings of the Departmental Committee of 1920 as to the great value of modern specialised methods in the restoration of the workman to his wage-earning capacity.

Sir WILLIAM H. WILLCOX (London) read a paper on the dangers to health arising from the use of

*Industrial Preparations of Arsenic,*

pointing to the fact that there had been a large increase in the number of cases of poisoning from industrial preparations of arsenic since 1908, and that apparently the ease with which very poisonous preparations of arsenic can be obtained for agricultural and horticultural purposes had been mainly responsible for this large increase. The Poisons and Pharmacy Act of 1908 removed many of the restrictions with regard to the sale of arsenical preparations and the increased facilities for the sale of industrial preparations had exposed the public to increased danger from arsenical poisoning. The most important compound of arsenic for industrial purposes was arsenious oxide, which for these purposes is frequently used in combination with an alkali when the very soluble sodium arsenite is produced. Examples of its industrial preparations were detailed and the poisonous effects described. Weed-killers, either liquid or solid, coloured or uncoloured, had given rise to many cases of accidental poisoning, and there was reason to believe that they had been used for criminal purposes on many occasions. Wood preservatives were on the market, consisting of arsenite of soda and uncoloured. The case of an immense wooden hut in which 2000 girls were employed, and which was sprayed with a well-known wood preservative, containing 32·1 per cent. of arsenic when undiluted, provided an example of providential escape, as owing to prompt measures at a relatively early date no case of arsenical poisoning occurred.

Arsenical sheep-dip provided the source of arsenic in numerous cases of accidental and criminal poisoning, as did fly-papers and fly-killing solutions. Arsenical rat powders, pastes, and liquids were extensively used. Taxidermists used arsenical soaps and pastes in the preservation of skins. The very general use of arsenical preparations, as sprays for fruit trees to destroy harmful insects, gave rise to many cases of chronic and acute poisoning, the insoluble arsenate of lead being most employed. A case exhibiting symptoms of paroxysmal attacks of hyperptyalism was described and it is probably unique. London purple, Paris purple, Scheele's green, Paris green are a few of the better known spraying preparations. The question of contamination in transit of foodstuffs with arsenical poisons had resulted in stringent regulations regarding the containers to be employed and placing the responsibility on the seller.

The speaker proceeded to expound the danger of assuming that even when carefully packed and labelled—"weed-killer," "sheep-dip," or whatever it may be—such articles can safely be sold and distributed like articles of ordinary merchandise, and pointed out how the public ought to be safeguarded. A tin or packet of weed-killer was at least as dangerous as a firearm, and the number of persons requiring such articles was not great. As a practical first step towards legislation in this direction Sir William Willcox proposed the resolution that—

> The sale of arsenical preparations included in Section 2 of the 1908 Act should be limited—on the part of the seller—to properly qualified and competent persons, viz., registered pharmacists, and—on the part of the purchaser—to those who had obtained licences for the possession of those dangerous articles.

This resolution was unanimously carried.

Sir THOMAS OLIVER (Newcastle-on-Tyne) agreed with the argument for the protection of the community from poisoning, and emphasised the value of the examples and cases cited. He adverted to one of the acute cases which had paralytic symptoms; this was unusual and therefore of particular importance from medical and legal standpoints.

Prof. A. ALLISON (Glasgow) read a paper on the importance of

*Teaching Medical Jurisprudence*

to students of medicine and law, in which he dealt with the scope of the subject as found in the medical curriculum and in the regulations governing entrance to the legal profession in Scotland and in England. The doctor and the lawyer should each have some knowledge of the subject, and while the doctor should understand the precision that is required by law, the lawyer should appreciate the limitations of medical evidence. Prof. Allison gave several striking instances to illustrate the unnecessary confusion arising from lack of mutual recognition of these principles. It had to be granted that doctors may honestly differ and that even well-informed doctors might make mistakes; lawyers did both. The criminal liability of the alleged insane had given rise to sharp conflict of opinion between law and medicine, and the difference was due largely to failure to recognise the standpoint of the other side. Prof. Allison advocated the establishing of a central institute of medical jurisprudence which would provide opportunities for research and for the training of experts in legal medicine.

Sir WILLIAM WILLCOX considered that the position of forensic medicine in the curriculum and examinations of medical schools and universities at the present day was unsatisfactory and demanded serious attention. Post-mortem examinations should be made, whenever possible, by pathological experts who were constantly engaged in the work. Too often medical students have become qualified with a knowledge of forensic medicine quite inadequate for the practical application of the subject when they are called upon to give evidence in a case or to assist in a medico-legal investigation.

Mr. J. DRUMMOND STRATHERN (Procurator-Fiscal for Lanarkshire) referred to the fact that one may be admitted to practice as a law-agent in Scotland without having studied in any way the subject of medical jurisprudence, and urged that there was no difficulty in affirming the proposition that the student of law should undergo, as part of his curriculum, a systematic study of this subject.

Dr. GODFREY CARTER (Sheffield) advocated that in all large cities the posts of divisional surgeons to the police should be abolished and the duties placed in the hands of one official who should devote most of his time to that work, and that the appointment should carry with it the lectureship in forensic medicine where such a centre existed.

Sir THOMAS OLIVER congratulated Sheffield on having now made arrangements whereby cases coming under the head of medical jurisprudence were to be dealt with by the professor of that subject in the University. In Scotland a similar practice had been in operation for many years.

Prof. GLAISTER gave his experience of the practice referred to by the previous speaker and the manner in which his students were afforded practical experience of medico-legal procedures.

## THURSDAY, JULY 27TH.

*Industrial Efficiency.*

The opening address was given by Sir THOMAS OLIVER, who took as his subject Some Factors which make for Efficiency and for Social Uplifting in Industry, introducing the subject with the thesis that "industrial efficiency" cannot be discussed without its obverse "industrial inefficiency." Industrial efficiency implied healthy workpeople and hygienic conditions for their labour. Men must be fit for their job and must keep fit. Since work was a service rendered to humanity as a whole its influence ought to be uplifting. To-day there were few trades which could be regarded as degrading, but it was not always thus—for example, early in last century when women, employed about coal-mines, dragged like beasts of burden trucks of coal, and when men were engaged for long hours on end in the puddling of iron. On the other hand, the subdivision of labour and the introduction of machinery on an ever-growing scale have abolished craftsmanship, and work has thus been robbed of one of its incentives.

As regards the health aspects, the importance of periodical medical examinations could not be overestimated. In this country children start their factory life at 14 years of age, and it would be to their advantage if after completing their apprenticeship they were medically examined regarding their fitness to continue the employment. It might be that for the physical breakdown in health of many young persons—i.e., those over 18 years of age—during the past years the non-repetition of the medical examination of children after having been drafted into factory life had been to some extent responsible. The early detection of disease or disability was of paramount importance. In the case of men and women continuous work at the same occupation cannot go on without structural changes in the body occurring, as indicated by a rise of blood pressure or an impairment of the action of the heart, which dietetic and medicinal treatment, accompanied by a respite from work, might possibly remove.

Some time ago the speaker had investigated the figures which appeared to suggest that an excessive mortality was occurring among female workers between the ages of 18 and 25 in Germany; he then found similar figures held for England and the United States of America. Also, orthopædic defects were apparently prevalent, and the explanation first to hand would seem to be hard work, poor food, and factory environment. Obviously there was much work to be done in this matter and medical examination must be the first step. Should a medical examination of workers, continued Dr. Oliver, be established in this country, it was surely possible that the health risk could in some way or other be brought within the range of life insurance, so as to give the examination an additional useful purpose. Experience has proved that such a scheme tends to lessen the turnover of employees and has improved the relations between employer and employed, an example being the Life Extension Institute of America.

Sir Thomas Oliver deprecated the apparent lightheartedness with which strikes were sometimes entered upon, and feared that the growing disinclination nowadays to fulfil obligations and to recognise the dignity of service was almost certain to bring its own Nemesis of unemployment and discontent.

Welfare supervision in the factory had done much to humanise industry, but care must be taken not to confuse sentiment in industry with the humanising of it. In its desire to solve problems of industrial hygiene, labour must coöperate with factory ownership, factory management, and medical inspection, for the problems cannot be settled by sentiment, but by reason and experience, and by an impartial consideration of all the circumstances involved.

Dr. JAMES R. KERR (St. Helens) considered that the incidence of scoliosis referred to by Sir Thomas Oliver as occurring in young female workers was probably a direct physical result of neglect of recreative exercise. The more artificial the nature of the occupation, and particularly the more asymmetrical the use of trunk and limb muscles in the predominant actions during work, the more essential was it to have experienced and specialist medical guidance and supervision, associated with games, physical drill, and gymnasium exercises.

As regards medical inspection of employees, Dr. Kerr asserted that the chief factor towards making this a successful institution, and with full advantage taken of its possibilities for beneficent purposes to employees, was the securing of the correct type of doctor. The factory doctor must have the spirit of service as his characteristic and entire frankness and fairness in his methods.

Dr. SALISBURY SHARPE (London) referred to observations he had been making of blood pressure in apparently healthy men engaged in various types of railway work. The analysis of these records might

disclose prevalent differences in distinct grades of employment, apart from physical types of employee, and thereby point out new signs of heart wear before the usual evidences of defect were apparent.

Dr. G. E. ORME (Clitheroe) was of opinion that the increased sickness incidence and death-rate in women mill-workers was due to increased consumption of alcohol, especially amongst young women, and to lack of parental control and influence, and of early domestic education.

Dr. A. SCOTT (Broxburn) had found that the work-people were readily interested in the results of their medical examination.

The PRESIDENT, in closing the discussion, dealt with the contract of service, written or implied, between the workman and the employer. He was of opinion that the time had arrived for the medical examination of workmen, in view of the responsibilities incurred by employment under the Workmen's Compensation Act. This could not, he thought, be legitimately objected to by the trade-unions. Prof. Glaister sounded a warning note against the danger of inferences drawn without discrimination from the occupational mortality tables.

Dr. KERR then read a paper on the

*Treatment of Industrial Accidents.*

He showed a series of photographs of the Pilkington Special Hospital, St. Helens, illustrating the treatment rooms and equipment of this unique establishment, including views of the warm pools and multiple baths for arms and legs, used in hydrotherapy; the hot-air cabinets; and the rooms for electrotherapy, massage, mechanotherapy, &c. Dr. Kerr pointed out that it was essential to appreciate the far-reaching consequences which result from an accident to an employee. The employer was concerned in the loss of the man's work and output, and the community had got to bear the burden of supporting a non-producing member. The amount of the compensation payment was of subordinate importance to the loss of the man's service as a workman. The situation thus broadly outlined had been squarely faced by employers, insurance companies, and friendly societies representing the workers, and these various interests were agreed that quite apart from its humanitarian and medical aspects, adequate attention to injured operatives was an economic proposition. While surgeon in charge of one of the large orthopædic and limb-fitting centres, Dr. Kerr had at the same time the opportunity of applying to industrial accident cases the methods and resources of modern orthopædic surgery, and had for several years now been providing for such cases the specialised treatment of the sort to which the Departmental Committee on Industrial Accidents refers. It was satisfactory to be able to report to this section that insurance companies, employers, the patients, and their doctors were most appreciative of this new phase of specialised surgical work. The orthopædic hospital should be a centre, available to the doctors of a wide area, for reference in difficult and tedious cases to treat which they had neither time nor adequate opportunity. The efficient treatment of industrial accidents was of vital importance to the community and the State. The larger insurance companies appreciated that the provision of specialised after-treatment was a profitable investment. The injured workman was no longer merely "a claim," and the mutual benefit was manifest.

Dr. J. C. MCVAIL said that what impressed him in Dr. Kerr's paper was the illustration it provided of the influence of government policy on the prevention and treatment of industrial accidents and diseases. The increase of employers' financial responsibilities through the superimposing on Common Law of the Employers' Liability Act and then the Workmen's Compensation Acts had been accompanied by a tremendous advance in the control, by means of orthopædic surgery and otherwise, exercised over such accidents and diseases, in the direction both of prevention and cure.

Dr. SHARPE found many cases in which the employer was made financially responsible for the effects of treatment over which he had no control.

Dr. D. A. COLES (London), in view of the losses arising from septicæmia following upon trivial wounds, inquired regarding the most efficient first-aid attention.

The PRESIDENT emphasised that as the employer was responsible for payments, often very great in total amount, which became due as the result of ineffective treatment, it was reasonable and natural that he should seek to improve the accident treatment service by such means as had been described in Dr. Kerr's paper.

Dr. KERR, in reply to the specific question of cost of treatment, reported that as the hospital described by him specialised in the after-treatment of industrial accident cases, these naturally came from a very wide area and were admitted on a simple capitation payment basis which had proved convenient and acceptable to the larger insurance companies and employers.

*Estimation of Working Capacity.*

Dr. JOHN GLAISTER, jun., read a paper on Some New Apparatus for the Estimation of the Working Capacity of an Upper Extremity, in which he described a contrivance designed to test both the willing and the unwilling patient's state of recovery and fitness for work. There were variable iron weights concealed in a box and these were lifted through a height of one foot by the patient. By varying the weights attached to the lifting rod the malingerer could usually be found contradicting himself, as he could not follow the sequence or judge the degree of the successive tasks presented to him. Dr. Glaister demonstrated the actual application of the apparatus.

Dr. KERR, commenting upon the paper and the apparatus, considered that if, in association with the measurements which were provided by the tests, there were records taken of the pulse- and respiration-rates during the succeeding 15 minutes and these figures and the progress of the pulse-respiration ratio were charted, further useful data for inferences would be provided.

Dr. MCVAIL emphasised that the time element in the test materially affected the record of the foot-pounds of work done and would require to be reckoned also.

*Occupation Dermatoses.*

Dr. SCOTT read a paper on the Occupation Dermatoses of the Paraffin Workers of the Scottish Shale Oil Industry and illustrated his thesis by numerous photographs and lantern slides of the conditions found among the workers. Seven types of dermatoses were described ranging from occupational comedones to epithelioma (paraffin worker's cancer), and the progression from the simple to the malignant stage was detailed as the result of unremitting observation and recording.

Dr. KERR suggested that the fat-solvent paraffin might produce the atrophy and dryness of the skin, which apparently resembled senile skin with its known liability to malignant tumour growth following chronic ulceration due to some stimulant or irritant constituent in the material concerned.

Prof. E. L. COLLIS (Cardiff) inquired regarding the results of the Wassermann test when applied to affected workers.

Dr. W. L. RUXTON (Newcastle-on-Tyne) summarised the problems which Dr. Scott's series of cases and observations had brought to the notice of the section.

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## SECTION OF MEDICAL SOCIOLOGY.

### FRIDAY, JULY 28TH.

### ALCOHOL AS A BEVERAGE AND ITS RELATION TO CERTAIN SOCIAL PROBLEMS.

As was anticipated, this important discussion attracted a large audience to the debating hall of the

Students' Union. Prof. E. MELLANBY (Sheffield) opened with a paper on the

*Action of Alcohol on the Human Economy.*

In view of the strong feelings held for and against alcohol as a beverage, and the fact that it often seemed to the average man to be a subject which required no special knowledge in order that he should strongly favour it as a great blessing to mankind or denounce it as the greatest curse, Prof. Mellanby said it was his duty in opening the discussion simply to describe some of the fundamental facts as to the action of alcohol on the human economy. If a food be described as that which can supply energy to the body, then alcohol was a food, but inasmuch as alcohol had the property of modifying the function of living tissue it must be regarded as a drug. Discussing it first as a drug, he said that by far its most important action was its power to modify the functions of the nervous system. The special affinity for alcohol shown by nerve cells was thought to be due to their high lipoid content. Other organs were also affected, but this action was less obvious, and was chiefly of interest in connexion with chronic alcoholic poisoning.

The immediate effects of alcohol showed apparent contradictions, producing at one time drowsiness, at another excitement, so that two schools of thought had grown up, one regarding the drug as primarily a stimulant, the other as a depressant. But the apparent primary stimulation was due to the narcotising of the cortical centres, whose function is to restrain and inhibit many of the activities of the lower parts of the nervous system, to allow us to judge and discriminate, and by directly influencing the thalamus to control our emotions. This action of alcohol explains the loss of judgment and memory, of the power of association, and the increased tendency to sleep, which it causes. It also accounts for the impairment of delicate actions associated with concentration and mental effort. The interference with emotional control accounts for the feelings of joy, misery, anger, and excitement which are called forth, and the feeling of lighthearted-ness due to forgetting of worry. Self-consciousness and self-criticism are lessened, so that apparently ordinary people may talk in a clever and interesting way and shy people become bolder. With larger doses of alcohol the depressant effects were more obvious. It was therefore clear that alcohol must be classed among the narcotic drugs, but this was not to deny its usefulness either as a beverage or a therapeutic agent, for narcotics had their usefulness as much as stimulants. Its value in syncope due to fright or pain was due to the prevention of excessive inhibition, and this was probably the cause of the results described by clinicians in heart failure due to pneumonia, typhoid, and other diseases.

Considered as a food it had been shown by Atwater and Benedict that almost the whole of alcohol taken in moderate quantities was oxidised. The oxidation of 1 g. of alcohol produced 7 calories of heat as against 4·1 calories liberated by the oxidation of 1 g. of either protein or carbohydrate. Alcohol had the further advantage that it required no digestion and was rapidly absorbed. Experiments on dogs and men proved that a surprising amount of energy could be supplied to the body, but these results had little medical interest, for a severe degree of intoxication was produced at the same time. It had, however, been found experimentally that a man weighing 70 kg. could oxidise 10 c.cm. of alcohol per hour and this fact was now being utilised in the treatment of diabetes. It was found that from 7 to 10 c.cm. could be administered per hour without any intoxication resulting and the provision of 630 calories of heat, a valuable adjuvant to the limited food-supply of the diabetic.

Lantern slides were shown illustrating the curve of alcoholic concentration in the blood with various measured doses of alcohol and these were correlated with slides showing the degree of intoxication as estimated by power to draw a simple figure. It was essential for therapeutic purposes that the alcohol should be well diluted. The strength should not exceed 5 or 6 per cent. Alcohol was of little use in cases of starvation or exposure unless shelter, warmth, or other food could be provided at the same time, because since it did not stimulate metabolism it had no specific dynamic action and encouraged the loss of heat.

The lecturer then discussed some of the factors in the production of tolerance, which he considered was less than that popularly assumed to be possible and not comparable to the tolerance that could be established in regard to opium and many other drugs.

Prof. A. R. CUSHING (Edinburgh), opening the discussion on the paper, said the food value of alcohol was admitted by everyone with any knowledge of the subject. But its value was exaggerated in recent years. Volume for volume, good pre-war beer was roughly equivalent to well-sweetened tea or coffee, containing milk.

Rev. COURTENAY WEEKS, M.R.C.S., speaking on behalf of the large body of temperance workers, claimed that alcohol was one of the most disastrous, destructive, and deteriorating factors in our national life. He gathered from text-books that alcohol did not repair or build up the body. During his war service he had never known it prescribed for sick or wounded soldiers.

Prof. W. E. DIXON (Cambridge) thought no useful purpose could be served by a discussion in which the results of a scientific worker were countered by the pious opinions of persons who were uninfluenced by ascertained fact. In the experiments in which he had been associated with the late Dr. W. H. R. Rivers it had been found that in every case the workman's output was increased under the stimulus of a certain quantity of alcohol, but the dose had to be increased after a time or it had no further effect.

Sir JAMES BARR (Liverpool) said that it was from the social point of view that alcohol should be retained. While it was, of course, much abused, a great deal of the present "unrest" was due to the difficulty and cost to the working classes of obtaining alcohol.

*Alcohol and Mental Disorder.*

Dr. JOHN T. MCCURDY (Cornell) contributed a paper on General Ætiological Factors in Alcoholic Psychoses. Speaking as an American psychiatrist, he said that since prohibition drinking in America had changed both in quantity and quality, but the evolution was not complete, and it would be folly to attempt to draw any conclusion of permanent value from conditions obtaining in America to-day. Considering various forms of alcoholic psychosis he said the ætiology was pure only in the cases of delirium tremens and Korsakoff's syndrome. The ravages laid at the door of alcohol were often those attributable to other factors as well. Alcohol liberated abnormal reactions that had been latent and at the same time increased whatever fundamental tendency to abnormality there might be. The man who wants to forget the world drinks. He gains the desired release. If this were all alcohol would be an unmixed blessing as an emergency measure.

Unfortunately this release is obtained by impairing the very faculties needed to obtain success, and anti-social tendencies are liberated at the same time which increase the maladaptation. Thus the vicious circle is formed. In normal people reason triumphs over impulse and they drink in moderation. The alcoholic before he ever touches a drop is an abnormal person. Speaking neither as a propagandist nor as an opponent, but purely as an agnostic, considering factors often neglected in discussion, he wished to point out some possible evil consequences of prohibition. If inebriety was accidental or the result of calamity, abstention would be harmless, but if not, there was probably in the individual sufferer a tendency to instability that would express itself somehow. He quoted cases in which mental and moral damage had ensued on abstinence, cases which, he said, reminded one of the parable of the seven devils that entered into the house that was "empty, swept and garnished." For one inebriate there were at least 100 moderate drinkers and of those some would be imperfectly adapted

There might be a danger of such people indulging in the kind of political activity where the mere excitement of strife is an end in itself.

Finally, there is the problem of heredity. The alcoholic is not fecund nor do his progeny thrive. Alcohol therefore eliminates the unfit. If we fail to treat the race with intelligent care, should we prevent Nature from working her way, however blind, slow, and unkind?

Sir FREDERICK MOTT (London), in introducing the subject of Alcohol and Insanity, said he had found asylum statistics quite unreliable in this matter, as the attribution of alcohol as a cause depended largely on the personal equation of the recording officer. That the rôle of alcohol as a causal factor in insanity was not so great as the published reports of the Lunacy Commissioners indicate was shown by the regional dissociation between the distribution of alcoholism and insanity. An investigation of war neuroses had disclosed a very high percentage (in one case 60 per cent.) of total abstainers among the sufferers. This was associated with fear of the consequences of alcohol or dislike of the taste, and consequent refusal to take the rum ration. A number of total abstainers admitted that the rum ration had been beneficial and that they had taken it when standing-to in the trenches preparatory to an attack. The Advisory Committee of the Central Control Board (Liquor Traffic) had concluded in view of the evidence that—

> The action of alcohol is a sedative to the highest centres of control and acts by causing a decrease of critical self-consciousness and anxiety. . . . There are emergencies when, though the individual may imagine he needs to be braced up nervously, he would be assisted far more by relaxation than by increase of tension, and here the sedative action of alcohol may be advantageous. The value widely attributed to the rum ration under conditions of acute discomfort, cold, and strain may be explained in this way.

Dr. W. C. SULLIVAN (Broadmoor) agreed that alcohol was a negligible factor in the production of insanity. It was, however, the cause of much antisocial behaviour, especially of suicide and crimes of violence and lust.

Prof. E. L. COLLIS (Cardiff) opened the discussion on

*Alcohol and Industrial Efficiency.*

He distinguished between convivial and industrial drinking. By the latter term he meant drinking at intervals during the working hours, as was done especially by dock labourers. He held it as proved that alcohol depressed both reflex and volitional acts, and that its combustion supplied no energy for muscular contraction. Statistics of the frequency of accidents and the percentage of absenteeism showed that both were at a maximum on the day immediately following pay-days. He quoted evidence from American employers of labour who held that efficiency and output had been increased by prohibition. He concluded that the time is not far distant when, if our habits are not rapidly brought within temperate limits, we may be compelled in the interests of efficiency to follow the example of America.

Dr. HINDHEDE (Copenhagen) showed in tabular form the reduction of mortality which had taken place in Denmark during and since the severe rationing that was necessitated by the blockade in 1917. Unfortunately, as far as statistics were concerned, not only was the alcohol consumption restricted during that period, but the entire mode of living of the Danish people was changed. A marked drop in the mortality rate, amounting for male deaths to 30 per cent. in the period October, 1917, to October, 1918, had undoubtedly occurred. The difference in male and female mortality rates was reduced to a minimum. He claimed that if France adopted a similar system 300,000 would be saved annually, and the problem of repopulation would be solved. He advised the British people to abandon alcohol entirely for two years. If it were found that 50,000 or 100,000 lives were saved, he supposed no sensible person would advocate a return to full liberty in a poison so dangerous.

The opening paper on

*Alcohol and Infantile Mortality*

was read by Dr. J. W. BALLANTYNE (Edinburgh). After a brief review of experimental research on the subject, he said there was evidence that in each of the three periods of antenatal life—the germinal, the embryonic, and the fœtal—the indulgence to excess in alcohol by either or both parents was a danger to the new being. After birth the effects of parental alcoholism were all such as to prejudice the survival of the child. He thought, however, it was unwise and misleading to claim the recent fall in the American infantile mortality rate as the direct result of prohibition. Many other factors had been at work, and to claim a premature victory for prohibition on insufficient or erroneous grounds would deal a blow to all real efforts to check infantile mortality along these lines.

Prof. LOUISE MCILROY emphasised the importance of care during the prenatal period. She considered fœtal welfare and fœtal mortality as more important than infant welfare and infant mortality.

In the absence of Prof. STOCKARD (Cornell), his paper was read by Prof. MCKAIL. His title was "Alcohol as a Selective Agent in the Improvement of Racial Stock," and the paper contained a summary of the experimental work carried out by him on the effect of developing eggs and on the sperm cells of guinea-pigs. He found that by crossing an alcoholised male with a normal female and tracing the progeny through several generations, there was a tendency for the weaklings to die out and an eventual improvement of the stock. The details of this research, however, have already been published and are widely known.

## SECTION OF TUBERCULOSIS.

THURSDAY, JULY 27TH.

Sir ROBERT PHILIP, the President, in his preliminary remarks, stated that this year for the first time tuberculosis had been given a special section. In 1888, when the Association last met in Glasgow, such a section was undreamt of. The tubercle bacillus had been discovered six years previously, but the discovery was still a matter of high laboratory work and academic discussion. The tubercle bacillus now formed the centre of a vast literature. Tuberculosis had become a notifiable infectious disease. For its treatment numerous institutions had sprung up; the medical student now received special training in the disease. Societies for its study and prevention existed in many parts of the world, and an international union representing 40 nations was in active being; since the last meeting of the Association in Glasgow the reduction of the death-rate had been remarkable.

Prof. E. RIST (Paris) opened a discussion on the

*Clinical Differentiation of Pulmonary Tuberculosis*

from other respiratory affections. The experience of the war, he stated, had set the problem of tuberculosis in a new light; mistaken diagnosis in lung tuberculosis was all too frequent. New and important knowledge had been gained, to which our diagnostic procedure should be adjusted. He summarised what he meant under four heads.

1. The skin reaction proved that tuberculous infection was almost universal, occurring first usually in the earliest 15 to 18 years of life, and protecting the majority of adults against further infection. A positive skin reaction was indicative merely of infection and not of disease.

2. The X rays as an aid to diagnosis. The clinician should master the technique of fluoroscopy and the reading of X ray plates, controlling the information by ordinary methods of physical examination. X rays revealed the presence of deep-seated lesions and cavitation, and showed the extent of consolidation more accurately than other methods of physical examination, interpreting the sequence of events in the evolution of tuberculosis.

3. Examination of sputa was implied in complete examination. Methods had been improved; homogenisation of the spit and inoculation of guinea-pigs were now largely used. Tubercle bacilli appear in the spit much earlier than was admitted previously. We are less inclined now merely to rely on physical signs and symptoms in diagnosis. A lung

lesion with sputum showing no tubercle bacilli makes very plausible the possibility of a non-tuberculous lesion.

4. Infection of the upper respiratory passages. There is no real frontier between the provinces of the nose and throat specialist and of the lung expert.

The diseases most commonly mistaken for lung tuberculosis fell under three heads:—

1. Ailments not due to the affections of the respiratory system: (1) Diseases of the cardio-vascular apparatus, causing dyspnœa, cough, thoracic pain, and hæmoptysis, and frequently complicated with bronchitis, pleural effusion, passive congestion, pulmonary œdema, and embolism; (2) cancer of the digestive tract, causing wasting, loss of appetite, and progressive weakness; (3) diseases like Graves's disease, producing loss of weight, instability of the temperature, and tachycardia.

2. Non-tuberculous intrathoracic respiratory diseases—e.g., (1) pulmonary syphilis, usually regarded as tuberculous until repeated negative spits gave rise to suspicion. (2) Echinococcus, more frequently found in France, the Argentine, and Australia than this country, and only to be differentiated from tuberculosis by X rays, the complement-fixation test, and the absence of tubercle bacilli in the spit. (3) Cancer, of which the differential diagnosis was difficult; a careful X ray examination and microscopic examination, if possible, of a subcutaneous nodule should be made. The presence of tubercle bacilli in the spit might not exclude cancer; a malignant growth might develop on the wall of a tuberculous cavity. (4) Bronchiectasis was characterised, like tuberculosis, by intermittent attacks of cough and spit—not at first offensive. Hæmoptysis was not uncommon. Focal consolidation and cavitation were found. Apical bronchiectases were not more uncommon than basal tuberculosis. Such patients had non-bacillary purulent sputum. The trouble usually began after pneumonia, broncho-pneumonia, or whooping-cough, and might follow on the aspiration of a foreign body into a bronchus. (5) Purulent non-tuberculous pleurisy, often loculated, giving focal signs and symptoms, such as fever and wasting, and, if ruptured into a bronchus, purulent expectoration.

3. Morbid conditions of the upper respiratory passages most commonly led to errors in diagnosis. Acute coryza, or rhinitis and chronic rhinitis spread from the nasal cavities to the pharynx, larynx, trachea, and bronchi, and caused cough and spit. Sinusitis, adenoids, hypertrophied tonsils, hypertrophied turbinates, and deflected septa all caused chronic infections. Nasal obstruction could produce apical collapse simulating early tuberculosis; such patients frequently only complained of cough. Curetting of an antrum, removal of a hypertrophied turbinate bone, of tonsils, or of adenoids, often cured apical catarrh or bronchitis.

The reasons for errors in diagnosis were many. Two might be dwelt upon—

1. The insistence on the importance of the early diagnosis of pulmonary tuberculosis.

2. The importance attached to symptoms versus signs as a possible basis of diagnosis. There was no symptom or group of symptoms that tuberculosis did not hold in common with other diseases.

After analysing the symptoms, one should look for the signs of a localised lung lesion. The physician should not ask "has the patient tuberculosis?" but "has he a localised symptom anywhere to account for the lesion?" If so, tests should be utilised; there was only one positive test for tuberculosis—the finding of tubercle bacilli. One positive result might mean very little. If no tubercle could be found some other disease must be suspected.

Prof. S. LYLE CUMMINS (Cardiff) commented upon the value of a diploma in tuberculosis such as had been established at the Welsh University. In regard to the early diagnosis of phthisis, he thought that Dreyer's method of estimating the vital capacity was not sufficiently utilised. He found that 12 cases with tubercle bacilli in the sputum showed a diminution of 23 per cent. in the vital capacity. Other 9 cases of lung disease which did not show tubercle bacilli had a diminution of not more than 10 per cent. In regard to serological diagnosis, the von Pirquet test was too sensitive to be of value. The opsonic index should not be put aside. He had used it recently with great advantage.

Dr. MARCUS PATERSON (London) stated that differentiation must be made between infection with the tubercle bacillus and illness from tuberculosis. A person might have tubercle bacilli in the sputum and yet not be ill with tuberculosis. The auto-inoculation test was of value in this connexion. He had investigated advanced cases of infection in childhood. Examining 100 cases he found evidence of glands in no more than 40 per cent. He did not find that patients with advanced tuberculosis died of the lighting up of abdominal tuberculous mischief. He emphasised Prof. Rist's remarks regarding the necessity of repeated examination of sputum. Leaving out cases in which tubercle bacilli were only found once, or which had been negative for 20 times, he found that with positive cases two out of three specimens obtained were negative.

Dr. STRUTHERS STEWART (Banchory) remarked that a tuberculous physician should always be a trained radiologist. Too much stress had been put on radiography, and too little on examination with the fluorescent screen. It was not possible in the majority of cases to differentiate between active and quiescent disease. He found that sinusitis and antrum disease often misled in diagnosis. In tuberculous patients a common cold increased the moist sounds elicited on auscultation over the diseased areas, and in laryngeal cases the lung often healed up while the larynx lagged behind. There was great difficulty in the differential diagnosis of tuberculosis and malignant disease. In two cases of sarcoma he found one with physical signs limited to the base, and bronchial breathing; frequent examination of the sputum was negative. The other had bilateral pleural effusion, a condition that he never found associated with tuberculosis.

Dr. J. CROCKET (Bridge of Weir) stated that he appreciated Prof. Rist's paper, but felt that there was another side to the picture. Undoubtedly, many cases were diagnosed as tuberculous that did not suffer from that disease. Many more were diagnosed and treated for other conditions who suffered from pulmonary tuberculosis. Of 1100 cases under treatment at Bridge of Weir Sanatorium during the past three or four years 168 had been discharged as "not improved." The majority of these patients were now dead. Only 31 had been known to be suffering from pulmonary tuberculosis previous to admission. The remaining 137 had been under treatment for from 1 to 15 years for other conditions, particularly bronchitis, influenza, anæmia, laryngitis, rheumatism, and neurasthenia. There was little doubt that they had suffered from phthisis during this period. To miss tuberculosis when it was present was much more serious than to diagnose tuberculosis and treat the patient for that when it was not there. Sputum examination was unreliable in diagnosis. Out of 2204 cases tubercle bacilli were only found by himself on the first examination in 60·9 per cent. One patient examined 57 times only showed tubercle bacilli on five occasions. One patient, previously in the sanatorium, with numerous tubercle bacilli in the spit, was recently readmitted on account of an exacerbation of the disease; her sputum had been examined 15 times since readmission, with negative results. Von Pirquet's test he had found far from satisfactory; positive results were obtained in only 80 per cent. of the 700 undoubtedly tuberculous cases. He had been rather disappointed in the results of the complement-fixation test. Dealing with several hundred cases, he got 90·5 per cent. positive. Only 9 per cent. of tuberculous cases gave a negative reaction, but 12 per cent. of control cases, undoubtedly not having clinical or obvious tuberculosis, giving a positive reaction.

Dr. A. H. GOSSE (London) had found that the complement-fixation test was a test not of infection, but of active disease. Of a series of cases of pulmonary tuberculsosis with tubercle bacilli in the sputum 98 per cent. gave a positive result. The other 2 per cent. became positive in three or four weeks. Of control cases he examined 40 patients with other diseases, and found 98 per cent. negative; 2 per cent. were positive. Although there was no clinical evidence of a lesion, time would show whether tuberculosis was present. The after-history of the cases was important. He found the test became negative in a few cases formerly positive after the disease was arrested; a man 24 years of age, who had had pleurisy with effusion, and gave a positive reaction, gave a negative result a year after

discharge from the sanatorium, whilst on full work. The disease in this case was apparently quite arrested; the man had put on 2½ st. in weight.

Dr. J. LAWSON (Tor-na-Dee) said that broncho-pulmonary spirochætosis was not infrequently confused with pulmonary tuberculosis. The disease had been described by Castellani, and was found in both acute and chronic stages. There was usually a febrile attack, with temperature often of an inverse type; hæmoptysis was not uncommon, and patients usually suffered from cough. The general condition was rarely much affected; the sputum, negative to tubercle bacilli, swarmed with spirochætes. In the differential diagnosis X rays were useful. A radiogram did not give evidence of infiltration. The sputum was thin and watery, with grey mucoid material. If allowed to stand it produced a nauseating odour.

Dr. C. MUTHU (Mendip Hills) stated that while Prof. Rist was correct in indicating that many cases are wrongly diagnosed, a positive diagnosis was more often missed than wrongly made. Negative sputum did not indicate the absence of tuberculosis. Physical signs were more important than the presence of tubercle bacilli; sometimes these also failed, as in a common type of case characterised by high temperature, tachycardia, and enlarged glands, ending fatally, usually from general toxæmia. Symptoms, although often common to many respiratory diseases, were more important than either the examination of the spit or the presence of physical signs. Differential diagnosis was very difficult in apical and localised conditions, particularly bronchiectasis, unresolved pneumonia, and influenza conditions. Cases presenting difficulty should be dealt with as tuberculous, and sent to a sanatorium for observation and early treatment. To wait for the appearance of tubercle bacilli was to risk the patient's life.

Dr. E. E. PREST (New Cumnock) said that as medical superintendent of a sanatorium he agreed with Dr. Crocket that the error chiefly made lay in not diagnosing tuberculosis when it was present. To wait until tubercle bacilli appeared was to wait until it was too late. X rays gave no indication of activity or quiescence of a lesion. We must, therefore, rely upon symptoms. Many cases declared to be non-tuberculous were, in his opinion, really tuberculous, but became symptomless under observation.

Dr. JAMES TAYLOR (Glasgow) opened a discussion on some aspects of the

*Treatment of Surgical Tuberculosis.*

Glasgow, he said, since the close of the war, had been able to devote more attention to the treatment of surgical tuberculosis, and had now 300 beds available for such cases. He desired to give indications of difficulties encountered and his experience of the various methods of treatment recommended. The type of case dealt with was not good. Many had sinuses and abscesses. Previous to the opening of Robroyston Hospital a year ago, when 40 patients were accommodated in a temporary building, he tried trypsin without any improvement following. As the treatment was not painless he gave it up. For the past year his patients had been treated along the lines laid down by Dr. Rollier in "La Cure de Soleil." The exposure of the body was gradual, till the patient was exposed six hours per day. The results, although less striking than Dr. Rollier's, were good; climatic conditions in Scotland were not as good as in Switzerland, and the humid smoke and dust-laden atmosphere absorbed or reflected most of the ultra-violet rays. He usually got his patients to pigment well. He doubted whether pigmentation had any definite relationship to prognosis.

In treating abscesses he tried aspiration. In many it was very successful. In others the abscess broke down, and occasionally infection occurred along a needle tract. Cutting down and removing the lining wall of the cavity was not successful. In two-thirds of the cases the wound usually broke down, and there resulted a sinus. The best results were obtained by the use of aspiration and the injection of modifying liquids as advocated by Calot. The solution of iodoform in ether and oil with creasote and guaiacol was particularly good. The quantity of pus was thereby reduced, and the patients required to be aspirated less frequently. For sinuses, if grossly infected, little could be done other than providing free drainage and building up the patient's resistance. In an afebrile case Calot's paste was good. Sinuses infected with the streptococcus appeared most resistant to treatment. Dr. Henderson, the radiologist, had recently dealt with tuberculous glands by deep therapy with very good results. The effects of such treatment on bone tuberculosis was at present uncertain.

Three hundred cases were tested by the Wassermann reaction. A positive reaction was obtained in 5 per cent. In treating such cases with arsenical preparations great care had to be exercised. Even small doses caused tuberculous sinuses to break down and abscesses to form. Immobilisation with extension and plaster appliances assisted the treatment of abscesses and sinuses. Deformities resisting extension were frequently corrected by careful manipulation. Surgical treatment must be conservative. If, however, climatic conditions were not very favourable, operative interferences combined with general treatment gave the speediest, although perhaps slightly less perfect, results.

At an afternoon meeting, held in the Kelvin Hall, Dr. A. ROLLIER (Leysin) gave a demonstration on the

*Share of the Sun in the Treatment and Prevention of Tuberculosis.*

He stated that he believed that the sun was the source of life, not only for the healthy, but also for the sick, and that it should be an important weapon in the therapeutic armoury against tuberculosis. So-called surgical tuberculosis was a general infection, and satisfactory results only could be expected with treatment giving a general as well as a local effect. Sun cure could be carried on anywhere. Leysin had this advantage—there was least interruption. The rays were bactericidal and penetrated even to deep lesions. Pigmentation could be attributed to the ultra-violet rays, which penetrated to the depth of 1 mm. and were absorbed by the capillaries. By means of slides he showed the effects of the sun on the skin, which was a closely woven set of sensory nerves, and might be compared to a keyboard. Exterior impressions acting on this provoked resonance in the whole organism. As the natural surroundings of the scales of a fish was water, so the natural surroundings of the skin were permanent contact with air and light. In utilising the air and sun in treatment dosage was important. Precise rules must be followed. Such baths should be taken gradually, and the degree of insolation increased by a few minutes each day.

The PRESIDENT said the demonstration had been a luminous object-lesson. Dr. Rollier had viewed tuberculosis, not as a local disease, but as a general infection which may manifest itself by spurts anywhere. He had shown himself a scientist and a naturalist, a child of nature who had gone to nature to learn the lessons of nature.

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LEWES VICTORIA HOSPITAL.—At the annual meeting of the hospital and dispensary on Sept. 5th it was announced that the governors had obtained the sanction of the Charity Commissioners to make a charge for the use of beds in the public wards. To meet the case of persons entitled to receive the benefits of the charity, four beds, two in the men's ward and two in the women's ward, would be reserved for their use. Including 14 in the private wards, the patients admitted to the hospital during the year totalled 119, and with the 11 previously on the books made a total of 130. There were 8 deaths, 114 patients were discharged cured or relieved, and 8 were still in hospital. Receipts showed a net increase of £65 2*s.*, and expenditure a net increase of £126 6*s.* 11*d.*, of which salaries and wages accounted for £87 16*s.* 6*d.* Since 1915 the total expenditure of the hospital had increased by £839 13*s.* 11*d.* Subscriptions had decreased by £42 17*s.* 6*d.*, and the donations had increased by £289 1*s.* 2*d.* The market value of invested funds had increased by £1643 18*s.* 7*d.* over the last year's figure.

# THE LANCET.

*LONDON: SATURDAY, SEPT. 16, 1922.*


## Food Poisoning.

THE special judicial inquiry into the outbreak of food poisoning at Loch Maree has now been concluded. The jury found that no fault or negligence attached to any person, that no precautions which could be suggested would have avoided the accident, and that there were no defects in the system of manufacture. A judicial inquiry could hardly come to any other conclusion on the facts submitted, but a scientific profession cannot leave the matter there, and it is worth while to consider how such disastrous outbreaks can be prevented, or at least their occurrence reduced to a minimum.

In the Loch Maree cases sufficient material was available to establish definitely that the outbreak was one of botulism, and that the vehicle of infection was the wild duck paste used to make the sandwiches which were supplied to the infected cases. This paste not only contained extremely virulent botuline toxin of type A, but from the paste the botuline bacillus itself was isolated. The organism was also obtained from one of the sandwiches made from the paste. Unfortunately no satisfactory explanation is available as to how the paste became contaminated. Dr. A. W. J. MACFADDEN, the medical officer of the Ministry of Health in charge of the Food Section, went over the factory and was satisfied as to its cleanliness and the methods of production. The bacillus itself is comparatively unresistant to heat, while the toxin is said to be destroyed by exposure to a temperature of 80° C. for half an hour; both should therefore have succumbed to the ordinary processes of manufacture. The spores were at one time supposed not to be of high resistance, but later investigations have shown that they behave towards heat very much like the spores of other anaerobes, and may resist even a temperature of 100° C. In the Loch Maree outbreak it was shown that the potted meat had been sterilised sufficiently to destroy bacilli and toxins, and, since there was no evidence of local contamination of the paste, presumably the spores of *B. botulinus* survived the heating processes, subsequently to multiply and produce their virulent toxin. Two facts stand out as worthy of comment. Experience with infected canned fruits has shown that the peculiar musty odour of foods contaminated with the botuline organism is a valuable danger signal, leading to rejection. Discrimination becomes impossible when highly spiced foods, such as wild duck paste, are used, and the safety factor is lost. The unfortunate hotel party would have been much better served if they had been provided with fresh food, such as eggs and greenstuff, for their outdoor lunch; if this outbreak brings such foods more into vogue for this purpose it will have done some good. The other point is the need for knowledge as to the distribution of *B. botulinus* in nature. Some mention has already been made[1] of investigations on the distribution of the spores in soil and other places, but the inquiry is still incomplete. The possible relationship to animal disease has been scarcely studied in this country, nor do we know the extent to which the bacillus may be present in the excrement of birds and animals. It was found in the intestine of a pig by KEMPNER and POLLOCK many years ago, and more recently by DICKSON and BURKE, and has been isolated from fruit contaminated by excreta. Whether the spores gained access to the wild duck paste from these or other sources must remain a matter of speculation.

The whole problem of the distribution in nature of the bacilli of food poisoning and the tracing of the paths of infection is one which demands intensive study before outbreaks can be prevented. It is a matter of satisfaction that this need has been realised, and that a year ago[2] the Ministry of Health and the Medical Research Council combined to initiate a special inquiry, the work being under the control of Dr. W. G. SAVAGE and Dr. MACFADDEN. Considerable progress has been made, although no results have as yet been reported. Pending more extended knowledge the decision of the Ministry of Health to make botulinus antitoxins available in certain large cities is of value, as prompt administration of the serum may save lives.

[1] THE LANCET, Sept. 2nd, p. 523.

## The Pneumococci and Their Antibodies.

MANY years ago OSLER pointed out that pneumonia was steadily rivalling tuberculosis as, in JOHN BUNYAN'S quaint phrase, Captain of the Men of Death. No disease, as Dr. W. H. WYNN remarked [1] recently in our columns, is so great a foe to the hard-working business or professional man. Sir GEORGE NEWMAN states in the preface to a report [2] on Bacteriological Studies, just issued by the Ministry of Health, that during the year 1921 pneumonia was responsible for the death of 34,708 persons in England and Wales, apart from deaths in which pneumonia was the secondary complication, for example, measles, whooping-cough, and influenza. If the number of these deaths from secondary complications, statistics of which are not given, be added to the 34,000 odd deaths from pneumonia itself, OSLER'S statement must be well within the mark. And when we consider, further, the number of cases in which a terminal pneumonia is the last phase in many of the chronic maladies such as valvular disease of the heart, we may surely regard this disease as one of the chief enemies of mankind. All attempts, therefore, to explore the causes of this excessive mortality are to be welcomed, and the researches of the group of workers at the Ministry of Health are a record of painstaking bacteriological investigation. The report in question consists of four sections: (1) A review of the recent work on pneumococci by Dr. ARTHUR EASTWOOD, (2) types of pneumococci by Dr. F. GRIFFITH, (3) serological differences amongst pneumococci by Dr. EASTWOOD, and (4) the distribution and serological characters of influenza bacilli by Dr. W. M. SCOTT. This last section deals entirely with the influenza bacillus, and therefore does not come within the range of our present discussion, albeit it is a careful inquiry into a difficult subject on which light is much needed.

Dr. EASTWOOD makes the work of NEUFELD and his colleagues the starting-point of the review of the present-day pneumococcal immunity problem. Some years ago NEUFELD and HÄNDEL showed that the majority of the strains of virulent pneumococci isolated from cases of pneumonia were serologically

[2] THE LANCET, 1921, ii., 720.
[1] THE LANCET, Sept. 2nd, p. 493.
[2] Reports on Public Health and Medical Subjects. No. 13. Published by H.M. Stationery Office. 1922. 2*s.* 6*d.*

identical, and these they regarded as typical members of the group. Other virulent strains differing serologically were regarded as atypical. NEUFELD then suggested that only a "typical" immune serum would protect against a "typical" pneumococcus, and an "atypical" serum against an "atypical" pneumococcus. At this point the workers of the Rockefeller Institute took up the tale, and by the examination of large numbers of virulent pneumococci they have now isolated by means of the agglutination and precipitation tests 15 different strains—viz., Types I., II., and III., and 12 varieties of atypical Type II. strains possessing "partial antigenic characters common to Type II. pneumococcus." There still remains, however, a large heterogeneous collection of pneumococci which have hitherto defied all attempts at typing. These originally received from the Rockefeller workers the somewhat unfortunate designation, Type IV., though they are, in reality, not members of a type in the sense in which the word is used for the other types, but are merely a sort of pneumococcal scrap-heap of non-agglutinable strains. LISTER, in South Africa, has also attempted a serological classification on lines similar to those of the American workers, and his types appear to correspond closely. He has also used organisms of these different groups for the purpose of prophylactic vaccines in Rand miners with successful results. Investigations in this country so far have been few in number, but in the main they also confirm the results of the American workers. Finally, NICOLLE, JOUAN, and DEBAINS, in France, have adopted the dilute acid and neutralisation method of PORGES, and thereby procured pneumococcal strains which were all agglutinable by the serum appropriate to their race, thus eliminating the heterogeneous collection of atypical strains recorded by other workers. These various facts are all set forth in historical sequence in Dr. EASTWOOD'S introductory section. In the second section of the report Dr. GRIFFITH describes in detail an investigation made, on these lines, into the distribution of type of 150 cases obtained from various sources in Great Britain. Naturally those strains of pneumococci which fell within the original non-agglutinable Type IV. group of the American nomenclature were of most interest because it is in this heterogeneous collection that the solution of the pneumococcus agglutination problem must be sought. And in passing we would venture to express the hope that all bacteriologists will follow the lead of Dr. GRIFFITH and others and speak of this collection as Group IV. rather than Type IV. so that the latter word may be reserved entirely for agglutinable strains. Forty-five of Dr. GRIFFITH'S 150 cases were found to be non-agglutinable with the original American Types I., II., and III. serums. In later investigations 12 serologically different types were obtained from these Group IV. cases, and though possibly related to Type II. were serologically independent of each other and of the three well-known types. Protection tests on mice confirmed the serological independence of the types of pneumococci.

One great value of this work lies in helping to clear the ground for the future work of international conferences on the standardisation of serums and serological tests. It is essential that all the methods of investigation should, as far as possible, be comparable and to this end standardisation and the use of synonymous terms are necessities. On the other hand, care will be needed to avoid such stereotyping of method as may conceivably exclude new ideas for which research workers are ever on the look out. Great care is also necessary throughout in checking results. As a case in point we may cite the very interesting data given by Dr. GRIFFITH on pp. 35-38 on varieties of types yielded by the same patient and mixed cultures. All these facts bear definitely on the vexed question of the mutation of bacteria which is bound to be raised sooner or later in a research of this kind, and it is easy to see how a careless worker getting hold of a mixed culture of pneumococci may confuse the issue serologically. In the third section of the report Dr. EASTWOOD discusses at considerable length the problems of antigen and antibody as applied to the two questions of serological races of pneumococci and the production of anti-serums to these races. This section consists of a reasoned argument, based on the study of colloidal phenomena, which cannot be readily summarised here. The issue of specificity is raised. Are the serological differences found to exist in the three known types of pneumococci and in the numerous variants of Type II. really specific characteristics? Dr. EASTWOOD feels that NEUFELD'S well-known views on this subject ought not to be accepted as final. Without going to the other extreme and assuming—for which assumption there is no proof—that the pneumococcus can be changed in the living body from one type to another, it seems possible that further research into the colloidal properties of the antigen and antibody may demonstrate some fundamental serological relationship between the different types. Dr. EASTWOOD says: "I think the study of serological differences amongst pneumococci has not led to any final conclusions such as would justify the opinion that no serum will be therapeutically efficacious unless it contains an antibody corresponding to the antigen which is peculiar to the infecting strain." As in many other branches of bacteriological research we appear to be held up for want of more biochemical data on which to base conclusions. It is a puzzling fact that, so far, only Type I. antigen has shown any marked capacity for generating a therapeutically useful antibody.

## College Students and Venereal Diseases.

NOT infrequently the importance of education of the young as a means of diminishing venereal disease is doubted because, it is asserted, medical students with their special knowledge do not manifest any markedly less proportion of venereal infection than other students. The statistical foundation of such a statement is open to doubt, though there may be force in the contention that intellectual knowledge of risks, apart from the steady development of the power of moral inhibition, is unequal to the task of overcoming a chief passion of human nature. The evidence in favour of gradual improvement among college students is marshalled in a recent issue of the Washington Government's *Public Health Reports* for August 4th. No definition of college students is given in the report, but from incidental evidence it appears that the information was derived from many of the largest universities and colleges in America. Some of these institutions have several thousand students, including many medical students. A questionnaire was recently sent to 100 and answered by 65 college and university executives, asking whether during the last 15 years the student's attitude towards sexual promiscuity or his habits and practices have undergone any considerable changes. The answers received have no statistical weight, as they are not based on an exact sickness census. They must, however, be regarded as valuable, because they give the considered impressions and experience of many college presidents. There is a consensus of opinion that the present college student realises more fully than his brother of an earlier day

the dangers of promiscuity, and has, on the whole, a more enlightened attitude towards all sex matters. That this change has been due to a dominant extent to "hygiene" rather than to "morals" is the regretful view of some of these presidents. Among the factors concerned in the improvement, hygienic education, a more active concern in the physical well-being of college students, improvement in environmental factors, especially the elimination of the saloon and the suppression of prostitution, and the influence of co-education of male and female students, all appear to have borne an effective part. At one university, where last year over 7000 students were registered, there were not more than 20 recognised cases of venereal disease at any one time. There appears to be no doubt in the minds of a number of college presidents that the decrease in venereal disease is caused by the marked reduction in promiscuity and is not due to hygienic precautions consistent with the continuance of promiscuity. It would probably be safer to conclude that while promiscuity, according to the weight of opinion, has greatly declined the possibility that hygienic precautions have borne a part cannot be excluded.

The impressions of results recorded above may be contrasted with the results of examination of the second million drafted Americans during the late war. Examination at mobilisation camps showed that 5·6 per cent. of these men had a venereal disease at the time of examination upon arrival at camp. Only obvious cases were included, and no Wassermann examinations were made. It would appear likely that the amount of venereal disease among college students is markedly lower than is present in an average sample of the young adult population. This would be so, even after allowing for the fact that the comparison is between a male population on the one hand, and a mixed male and female population on the other. How much of the improved conditions in colleges can be attributed to the organised warfare against venereal diseases conducted by governmental and volunteer agencies, and how much to the more subtle campaign through the health and hygiene courses within the colleges must be left open to doubt. The improvement itself is real and hopeful for the future.

## HYGIENE AND THE CRIMINAL.

WE learn that the People's League of Health has recently extended its admirable propaganda work into a fresh field, and that, by arrangement with the Home Office, lectures on "Health of mind and body, how to obtain and preserve it," are now being delivered by members of the medical council of the League in the London prisons. Similar lectures are to be given during the coming autumn and winter in other prisons throughout the country. This is a most interesting and useful development of the activities of Miss Olga Nethersole's organisation. The sort of people who find their way into gaols are ordinarily as ignorant and as negligent of the laws of hygiene as of the other laws which regulate social conduct. The result of Dr. Hamblin Smith's questionnaire, mentioned in his recent book,[1] reveals an almost incredible ignorance of general topics on the part of the criminal apprentice. Instruction in the principles of healthy living should serve as a sound basis for inculcating wider lessons of good citizenship in matters that may seem to be of less immediate interest and profit to the individual. If, as a consequence of such teaching, some intelligent members of the prison audience should develop a critical curiosity regarding certain features of our existing penal system, and should find a difficulty in reconciling the regime of cellular confinement and rigorous silence with the doctrines of the hygiene of mind, the experiment, in its ultimate reactions, might be fruitful of even more valuable results than those contemplated in its initial aim.

[1] The Psychology of the Criminal. Methuen and Company. 6s.

# Annotations.

"Ne quid nimis."

## DISEASES OF THE PITUITARY BODY.

IN an old German anatomy book it is stated: "The belly-spittle-gland"—we render the statement literally—"is an organ that is very hard to find and on that account has no interest for us." Fortunately that is no longer the case in regard to the pancreas, and it is becoming less true in regard to the pituitary body which, being still harder to find, has nearly eluded serious clinical study. The physiology and pathology of the pituitary body have been enigmatic and controversial subjects, though the recent study of the effects of its removal in whole or part, the investigation of the effects of the administration of extracts, and the analysis of the clinical and pathological results of disease have greatly extended our knowledge. The literature of the subject is now extensive and not always easy of reference. The description of pituitary disorder given in systematic text-books is often exiguous and even that in larger works of reference is frequently incomplete, with the result that the practitioner is sometimes at a loss for an authoritative and up-to-date presentation of the present state of our knowledge when he has an opportunity of investigating an unusual case of pituitary disease. We publish in this week's issue of THE LANCET an interesting address, delivered before the South-West London Medical Society by Dr. H. Letheby Tidy, which should be of great value in this respect, since it gives a brief description of the anatomy and physiology of the pituitary body and a succinct and intelligible summary of the disorders now believed to result from disturbed pituitary functions. Dr. Tidy submits a useful provisional classification of these on the basis of overaction or deficiency of the secretion of the anterior and posterior lobes alone and of the gland as a whole. Acromegaly, gigantism, ateleiosis, diabetes insipidus, dystrophia adiposogenitalis and other types of adiposity, genital dystrophy, and infantilism are all associated with pituitary disturbance and find their place in this classification. It must be admitted that there are still many gaps in our knowledge, and it is to be hoped that all unusual cases may be studied carefully and recorded. Dr. Tidy's address should be read by practitioners interested in the subject and by those with cases under their care, as it may afford suggestions for special investigation and study.

## U.S.A. MEDICAL SCHOOLS: THE STUDENT'S CHOICE.

IN the *Journal of the American Medical Association* for August 19th are published, according to annual custom, statistics relating to medical education in the United States. Two years ago,[1] in these columns, we reviewed at length the changes which had taken place since 1904, when the Council of Medical Education and Hospitals of the American Medical Association came into being and began its much-needed investigation of the medical schools throughout the States. It was then pointed out that the standards of teaching given at these institutions varied very widely, many of the diplomas granted being recognised only in a few States. The Council of Medical Education had therefore rated medical schools in three classes, A, B, and C, according to their degree of educational excellence. Class A schools (at present numbering 68) are "acceptable"; Class B schools (numbering 6) give promise, under their present organisation, of being made acceptable by general improvements; Class C schools (numbering 6) require complete reorganisation, keep no satisfactory records of students' attendance, qualifications, &c., do not enforce rules regarding admission and graduation, are privately owned and

[1] THE LANCET, 1920, ii., 667.

conducted for profit, or for other specific reasons cannot be included in Class B. One college, which refused to have inspections carried out, is listed as "unclassified," with a note to the effect that, from information obtained, no rating higher than C should be given to it. Of the total of 81 medical schools thus classified, 74 are described as non-sectarian, 3 as homœopathic, 1 as eclectic, and 3 as nondescript. The decline of homœopathic and eclectic schools is shown by the fact that in 1901 they numbered 22 and 10 respectively. The American student is urged, before choosing a medical school, to obtain information of its requirements of preliminary education, of its teaching, classification, and fees, and of the extent of recognition of its diplomas. At present 38 (73 per cent.) of the State licensing boards require that before beginning the study of medicine a student must have completed two years of work in an approved college of liberal arts, in addition to a four-year high school education. All the better medical colleges now require this standard of preliminary education, and the student is warned that requirement of any lower standard is an indication that the medical education given will be correspondingly low. Adequate instruction can be given only in the Class A medical schools. Although a favourite bait offered by the inferior medical schools is that of low fees, the fees charged by some of the best (Class A) schools—particularly the medical departments of some State universities—are lower than those charged by several of the poorly-equipped Class C institutions. The better schools which charge higher fees spend several times the amount of the fee per year on each student, being enabled to do so by endowments or State aid. There are now more than 300 free scholarships available for deserving students in the better medical schools. The student is warned against accepting without confirmation the statements made in the extensive newspaper and magazine advertisement carried on by some schools. A serious pitfall to the student in the United States appears to be the number of institutions representing various unscientific or pseudo-scientific cults (osteopathy, chiropractic, &c.) which profess to train those who desire to cure diseases; the necessity of a thorough training in all the fundamentals of medicine is therefore emphasised. The essentials of an acceptable medical college are detailed, both as regards its educational requirements in the student himself, and in its organisation, clinical and other facilities, instruction, and financial basis. A list of classified medical schools is given, and the reader is left wondering—supposing the Educational Number of the *Journal of the American Medical Association* to have the circulation it deserves—how any but the Class A medical schools can continue to exist.

## DENTAL BENEFIT.

REFERENCES recently made in the daily press to the acceptance by the Incorporated Dental Society on August 31st of a scheme similar to that already adopted by the British Dental Association for the supply of dental benefits to members of approved societies show that there exists a widespread belief that such benefits are only about to be established and constitute an innovation. The fact is, of course, that dental panels have now been in partial operation for about a year. In August, 1921, a series of panels was formed in the nine central counties, the panels consisting of dental practitioners who were already on the register before the passing of the Dentists Act of last year. In April of the present year it was decided to organise a system of panels of registered dentists throughout the country. Executive committees elected from the panels in each area are now selecting representatives to a central panel committee; when this selection is completed a meeting will be held in London (probably during October) to formulate a general scheme for the carrying out of dental benefits in conjunction with approved societies. With regard to the work already done in this direction, the *National Insurance Gazette* for August 12th pointed out that in the experience of many societies dental benefit is the most popular and at the same time the most costly of the additional benefits offered by the larger insurance societies which found themselves enabled by accumulation of funds to extend their scope beyond the ordinary sickness, disablement, and maternity benefits. It was found that even where generous amounts were set aside for purposes of dental benefit, they were barely enough to meet the demands. Thus, a society with a membership of 20,000 "good lives" made provision for £1000 per annum dental benefit, to cover the full cost of dental treatment and half cost of dentures; this sum barely sufficed for the purpose. It may be argued, as the *Gazette* points out, that the first year of such benefit was bound to show exceptionally heavy claims, the whole membership being entitled to claim at one time, and that lighter demands may be anticipated in following years; on the other hand, a large percentage of the insured population were sceptical as to their title to additional benefit, and the claims of succeeding years may therefore be as heavy as in the first year. The *Gazette* goes on to emphasise the fact that the popularity of dental benefit should be welcomed by those responsible for the working of the National Insurance Acts, since digestive upsets account for a considerable proportion of the cost of sickness benefit, and prevention of these disorders will materially strengthen the position of any benefit society.

## PROF. SPITZKA AND HIS PATIENTS.

THE death, reported from New York last week, of Dr. Edward Anthony Spitzka, sometime professor of anatomy in Jefferson Medical College and director of the Daniel Baugh Institute of Anatomy in Philadelphia, recalls the remarkable opportunity which he possessed of verifying his clinical diagnoses by immediate post-mortem examination. He it was who performed the autopsy on and examined the brain of Leon F. Czolgosz, the assassin of President McKinley, and he had many opportunities of observing the changes found in other criminals after electrocution. In regard to Czolgosz, the character of mental disease from which he was suffering was not determined. There was no evidence of insane delusion or hallucination; he had no morbid mental exaltation or expansiveness of ideas suggesting mania, none of the mental gloom of melancholia, none of the conjoint mental and motor symptoms characteristic of general paresis, nor was there anything in his manner or conduct to suggest persecutory ideas or transformation of personality. Nothing beyond the absurdity of his statements and acts gave ground for any assumption of mental unsoundness. Prof. Carlos F. Macdonald, ex-President of the New York State Commission in Lunacy, recorded his unqualified opinion that Czolgosz, when he assassinated the President, was sane legally and medically and responsible for his act. It was therefore to be expected that the post-mortem examination should reveal nothing in the brain to account for intrinsic cerebral defect; Prof. Spitzka noted, however, that the brain did not exhibit that especial kind of asymmetry of gyral structure in the cerebral halves which he held to be characteristic of the brains of highly endowed individuals. The few peculiarities noted in the arrangement of the cerebral fissures were insignificant, the slight asymmetry of the skull being well within the normal range of variation. The examination was conducted with especial care in view of the attempt in those days to found a "school of degeneracy" to explain crime and social wickedness in terms of accidental persistence of lower types of human organisation. Spitzka was unable to confirm any such correlation of structural anomaly with criminal delinquency. His opinion on Czolgosz was that he was "socially diseased and perverted," but not mentally diseased. "The wild beast slumbers in us all" was the concluding sentence in his report. Ten years later Spitzka published an account of the changes which he found in the brains of five other electrocuted

criminals, removed and fixed within 15 minutes of death. In each case a number of perivascular lesions, 25–300 $\mu$ in diameter, were found scattered through the lower parts of the brain, the vessels showing beading, with an area of condensation surrounding them. The lesions suggested sudden liberation of gas from electrolysis, and might have an obvious bearing in medico-legal cases where death from electric current was alleged. Spitzka made a study of the brains not merely of criminals but of many eminent men of various races, and he found time to edit the eighteenth American edition of Gray's Anatomy. He was 46 years old at the time of his death.

## GRASS DISEASE AND BOTULISM.

SOME allusion has been made during the last few weeks in the daily press to the possible relation between botulism and a disease of horses in Scotland which goes by the name of "grass disease" or "grass sickness." It is not generally known that the Scottish Grass Disease Committee has been working on this matter for the last four years, and that Dr. J. F. Tocher, of Aberdeen, a member of this committee, was concerned in the earliest detection of the *Bacillus botulinus* in this country in 1919. The limitations of our present knowledge were set out in a paper by Mr. J. B. Buxton, F.R.C.V.S., read[1] before the Section of Pathology of the Royal Society of Medicine in January last. The grass sickness of Northern Britain appears to be identical with the forage poisoning of horses and cattle described in America, and an organism indistinguishable morphologically from *B. botulinus* was recovered by Dr. Tocher from the intestine and spleen of horses dead of this disease. An attempt was made last year to devise some means of controlling the incidence of the disease, and a botulinus-antitoxin prepared by the Wellcome Physiological Research Laboratories was employed, chiefly at first for curative purposes, although it was realised that, with the precedent of tetanus, its preventive application was more likely to command success. But even in cases which did not recover the acute symptoms of disease appeared to be checked temporarily by intravenous administration of the antitoxin. Further investigation revealed the presence in the blood of several chronic cases of an appreciable amount of antitoxin, type A. One of these animals had, it is true, received injections of high value botulinus-antitoxin some weeks previous to the blood examination. As, however, in a control experiment, antitoxin even to the extent of 25 c.cm. of high value was eliminated from the blood within 10 days, it was deemed at all events highly probable that chronic cases of grass disease do develop a certain degree of active immunity, as shown by the presence of antitoxin. Complement-binding antibodies were also found, although it was not possible clearly to indicate the presence of agglutinins. The Wellcome Laboratory has, we understand, been preparing botulinus-antitoxin of both types A and B during the last two years, and has, in conjunction with the Scottish Committee, recently initiated an experiment in preventive inoculation. Further work in this direction is proceeding.

## CONTROL OF CONCEPTION BY IRRADIATION.

MOST of the methods which have been devised for the control of conception, ingenious though many of them are, have been found to possess drawbacks for one or other of the consenting parties. In a recent number of the *Deutsche medizinische Wochenschrift* Dr. Emmerich Markovitz sets out a method which emanates from the Central X Ray Laboratory of the Vienna General Hospital. He submits that recent investigations have shown that the parenchymatous constituents of the genital glands are affected by X rays to the point of actual degeneration, while the interstitial tissue more or less escapes change. He proposes in cases where temporary cessation of conception is desirable to obtain it by alternately dosing the husband and the wife. In the early experiments of Gauss, of ten women about the age of 30 years, nine were rendered temporarily sterile by X ray radiation, whereas before the treatment they were bearing children at an average of one in 18 months. Weber went on to show that sterility set in within six months of irradiation, and M. Fränkel observed the return of menstruation and normal pregnancy a few months after stopping the X rays. More recently Seitz and Wintz have set out the exact dosage of X rays required to attain sterility with minimal damage to other than the immediately ripening follicles. In regard to the male, analogous results have been obtained, and Markovitz quotes especially the experience of Kriser, who at the Vienna Central X Ray Laboratory produced azoöspermia in a patient by means of minimal doses, giving in fact only thrice at two-month intervals 1 H through 0·3 mm. brass filter on the skin. Markovitz's programme would consist in irradiating the man before the ability to conceive returns in the woman, as indicated by the recommencement of menstruation. Since the duration of the sterilisation in the man is as yet unknown, he admits that periodical examinations of the spermatic fluid will be necessary. The morbid conditions for which the treatment is suggested are slight tuberculosis of good prognosis, Graves's disease after successful operative or X ray treatment, diabetes of slight grade, morphinism when not too pronounced, and such like. The treatment has the merit of avoiding finality. Prof. Holzknecht, under whom it is being carried out, lays down the principle that the doctor has no right to destroy more tissue than is necessary in the individual case; a partial exovulation not affecting more than 6 to 12 ovula should meet the case. The method implies agreement on the side of both parties. Dr. Markovitz appends a limited but useful bibliography to his paper.

## MALARIA IN THE MALAY STATES.

FROM the annual report for 1921 of the Chief Secretary to the Government (Mr. W. G. Maxwell, C.M.G.) it appears that, as usual, malaria heads the list of fatal diseases in the Federated States. The actual number of deaths from malaria was 17,168, a considerable decrease from the 20,595 recorded in 1920, but still nearly half the total for all diseases, giving a rate of 13·16 per mille as compared with 15·24 in 1920; but the disease is, of course, a contributory factor in many deaths attributed to other causes, and when the malaria sick-rate and death-rate are reduced, the total death-rate of the country will fall in proportion.

The Malaria Advisory Board meets every month, and almost every district has its mosquito destruction board. Any estate that requires an anopheline survey can obtain one, free from cost, together with a report and the health officer's recommendations, but to be effectual, anti-malarial measures must be carried out under the direct supervision of the estate medical officer, and constitute a duty of the owners of estates. The district mosquito destruction boards function in the town areas, villages, and kampongs. The (central) Malaria Advisory Board merely advises, controls, and coördinates the work of the district boards. The advisory board is endeavouring to achieve a policy of combined anti-malarial action by contiguous estates; where anti-malarial work is carried out under expert supervision upon an estate, and neighbouring State land or small holdings also requires to be treated, the Government considers applications for a fair contribution in order to render the operation effective. The anti-malarial works at Kuala Lumpur cover 6600 acres, and were maintained during the year at a cost of $22,126; the sum of $105,000 was expended on the erection of new works. The Port Swettenham anti-malarial area of 3100 acres was maintained at a cost of $4623; at Seremban a drained area of 1500 acres was maintained at a cost of $8283. Surveys at Taiping, Kuala Lumpur, Gemas, and Raub were carried out over an area of 2600 acres. At the

[1] Since published in the Veterinary Journal, April, 1922.

Institute of Medical Research, special investigations (which are still in progress) were made into the occurrence of quinine-resistant cases of malaria, and into the value of "cinchona febrifuge" as compared with quinine for purposes of treatment. Important work was done on the distribution of anophelines and seasonal prevalence of species; the results suggested that the distribution may depend on the nature of the food material available in the breeding-places—that is, on the algæ and other microscopic organisms—and that these, in their turn, possibly depend on differences in the chemical constituents of the water. The interesting annual reports of the Institute of Medical Research and of the Malaria Bureau may be obtained free of charge upon application to the Superintendent, Printing Department, Kuala Lumpur, Malaya.

## SCOTTISH ASYLUMS' PATHOLOGICAL SCHEME.

THE Board of the Scottish Asylums' Pathological Scheme, in its report for 1921, records that the usual routine work of examining and reporting on asylum cases has been carried out, and that vaccines have been prepared and supplied in suitable cases. Intimation was received during the year that the Treasury grant, amounting to 20 per cent. of the total contributions, would not be paid for the past year, owing to the stringency imposed on public expenditure. This grant has been paid since 1915. The General Board of Control used every effort to have the grant continued, and as a result a grant was obtained for the past year from the National Research Council on a similar proportionate basis to the Treasury grant; it is hoped that the Council will make a similar grant annually. The Executive Committee of the Board of the Asylum Pathological Scheme considered means for assisting the funds, and recommended extension of the benefits of the laboratory to general practitioners for investigation of private cases and preparation of vaccines, for which a fee might be charged. The Board approved the recommendation. The proprietor of the laboratory premises at 10, Morningside-terrace, Edinburgh, having decided to sell the property, new premises have been acquired at 51A, Frederick-street, where the work will be carried on after next Whitsuntide. The report records the Board's appreciation of the work carried on by Dr. W. Ford Robertson, pathologist at the laboratory. Dr. Robertson's report is appended to that of the Board; his research work has been directed mainly to chronic bacterial infections occurring in cases of dementia præcox. During the year 61 asylum cases were investigated and reported upon. In 52 cases the investigations were bacteriological, in 6 histological, and 3 were laboratory tests. Autogenous vaccines were supplied in most of the first group. Five visits were paid to asylums outside Edinburgh. In October a circular was issued for the purpose of systematic bacteriological investigation and treatment of a new series of cases of dementia præcox, and the general response of asylum staffs in this connexion was good. The results of treatment in some cases encourage the hope that this hitherto incurable form of insanity will become amenable to treatment at an early stage of its development. On the bacteriological side, evidence accumulates to the effect that all cases of early dementia præcox suffer from severe chronic bacterial infections of known neurotoxic character, involving chiefly the intestinal tract. The exact causative part played by these infections is still indefinite, but their suppression clearly results in benefit to the patient. The example of chronic infection by the tubercle bacillus is quoted, however, as a warning against extravagant expectations of easy cure in dementia præcox, should the causative agent be detected. Moreover, it is pointed out that chronic infection is only one of several factors in the pathogenesis of the disease. Three other important factors are (1) the psychological factor, (2) the effects of disorders of internal secretion, and (3) the auto-intoxication dependent upon intestinal stasis. Dr. Robertson believes that suppression of the two latter at an early stage would prevent the development of the malady—a view borne out in his experience by the successful treatment of ten cases by therapeutic immunisation, all ten patients remaining well after two years. Although many cases of dementia præcox never reach a mental hospital until the disease is far advanced, he believes and hopes it will be found possible to treat cases at a much earlier stage and to return many patients to their homes as useful members of the community. Nothing but early immunisation will, in Dr. Robertson's opinion, save the country from the necessity of soon enlarging asylums and incurring greatly increased expenditure for custody. Better facilities and more money for research are urgently needed. The Board, whilst admitting that progress in this respect must be slow, put forward a strong plea for the encouragement of work which holds such promise of usefulness.

## A NEW DIAGNOSTIC SIGN IN SCARLET FEVER.

FROM a review of recent work on scarlet fever in *Medical Science* for September by Dr. J. D. Rolleston and Dr. C. Lillingston, we learn that considerable attention has lately been paid on the Continent, especially in Germany, to a new diagnostic method introduced by Schultz and Charlton, and known by the name of the "extinction sign" (*Auslöschphänomen*). The test is carried out as follows. At the height of the eruption the patient is injected intracutaneously with 1 c.cm. of convalescent or normal human serum, and if the case is one of scarlet fever, an anæmic zone appears five to eight hours later, varying in size from that of a five-shilling piece to that of the palm of the hand. The phenomenon does not follow the injection of the serum of a scarlet fever patient in the acute stage, nor the injection of normal horse serum, diphtheria antitoxin, normal saline, or adrenalin solution, nor does it occur in measles or mercurial scarlatiniform rashes. Among 71 cases of scarlet fever in which Dr. Paschen of Hamburg tried this test it was positive in 62 and negative in nine, but in the negative cases the serum was used too late, or not injected intracutaneously. As an explanation of the phenomenon Dr. Paschen suggests that the dilatation of the cutaneous vessels caused by the scarlatinal toxin becomes converted into vaso-constriction by some peculiar property in convalescent or normal human serum. Similarly Dr. Neumann of Hamburg in 64 cases of scarlet fever obtained a positive result with very few exceptions which might be attributed to the early disappearance of the eruption, whereas the result was negative in measles, toxic scarlatiniform rashes, urticaria, serum eruptions, and paratyphoid fever roseola. He pointed out that advantage might be taken of the fact that scarlet fever serum in the acute stage does not cause the rash to fade by injecting the serum of a suspected case in which the rash is ill-marked or faded into an undoubted case of scarlet fever, with a well-developed rash. Disappearance of the rash as the result of the injection indicates that the doubtful case is not scarlet fever, whereas if the rash is not affected the diagnosis of scarlet fever is established. While the majority of observers have confirmed the value of the test, it is interesting to note that at least two—namely, Dr. Tron of the Milan Hospital for Contagious Diseases and Dr. Haselhorst of the Hamburg University Medical Clinic—did not find the sign sufficiently constant to justify its being regarded as of diagnostic value. Moreover, the necessity of first performing a Wassermann reaction and testing the serum for sterility before injection makes it doubtful whether the test will ever become widely applicable.

Sir Humphry Rolleston, President of the Royal College of Physicians of London, will open to-day (Saturday) the John Elliott memorial pathological and bacteriological laboratory of the Chester Royal Infirmary. The laboratory has been fitted and equipped by public subscription in memory of the late Dr. John Elliott (hon. physician to the infirmary, 1895–1921).

# THE ESTIMATION OF ARSENIC,

## WITH SPECIAL REFERENCE TO ITS DETERMINATION IN TISSUES.

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As the compounds of arsenic play a very important rôle in the treatment of disease, in industry, and in criminology, it is not surprising that many patients present symptoms resulting from the toxic effects of this drug and its compounds. The analyst, therefore, is frequently called upon to make estimations of this metalloid, and he has not only to decide the method he will employ, but also to pick out the particular technique he will use to achieve his result.

During the last few years a great deal has been written on the chemical estimation of arsenic in tissues and excretions, with a view to determining accurately the amounts in the various organs, and the rate of secretion of these drugs after administration; it may not, therefore, be out of place to indicate briefly the general principles involved in the estimation, and to describe methods which have been tried and found satisfactory. Arsenic is capable of being more accurately estimated in minute amounts than almost any other substance, but in order to obtain satisfactory results certain details of technique must be followed, or very serious discrepancies will appear, entirely vitiating the value of the work done.

### *Zinc an Unsatisfactory Reagent.*

As a preliminary step to the estimation, the first thought is the purity of the reagents, and with one exception these need not cause anxiety; the strong acids can be obtained from any reliable firm guaranteed to contain not more than 0·1 part per million of arsenic, which is good enough for almost all purposes. The ordinary solid chemicals bought as "arsenic free" are generally found to be satisfactory, but in all cases each fresh batch of chemicals should be tested. The only exception is the zinc used in some methods. I believe that it is a practical impossibility to obtain a sample of zinc in which the absence of arsenic can be absolutely relied upon, and in consequence I have entirely given up methods requiring the use of zinc. The problem is interesting, as it is often possible to carry out several experiments with a sample of zinc, experiencing no trouble in this connexion; then a further experiment may be done, and the impurity shows itself. It has often been noticed that the arsenic in the zinc will not appear until the experiment has proceeded for perhaps three-quarters of an hour. Explanation of this fact is difficult; but it may be due to the presence of "nuclei" of arsenic in the zinc, which only appear when the zinc around them has been removed by the action of the acid employed in the test. Some years ago I examined a number of samples of zinc from various sources, but all supplied by firms of the highest repute or prepared by chemists accustomed to this class of work. Not one of these samples could safely be relied on to give negative results in every case. This danger is twofold, in that it (1) shows the apparent presence of arsenic in a viscus free from arsenic, and (2) demonstrates an amount greater than is really present.

### *Methods of Estimation.*

The methods of estimation of arsenic in tissues, &c., range themselves into two groups: (1) Where the amount of arsenic present is weighable, and (2) where arsenic is present in unweighable traces. In both cases the preliminary stage—namely, the destruction of the organic matter present and the conversion of the arsenic into "inorganic" form—is essential. Whatever method is employed it must be remembered that arsenic is a volatile metalloid, and great care must be taken in all operations involving heat, or loss will occur; even with due precaution a slight loss probably occurs.

(1) *Weighable Amounts.*—Of the many methods possible probably precipitation of the arsenic as the sulphide $As_2S_3$ and weighing of the precipitate is the most satisfactory; it has given me excellent results, and amounts as small as a few milligrammes of arsenic may be worked with. The tissues are broken up with hydrochloric acid and potassium chlorate, as suggested by Fresenius; the excess of chlorine is removed by boiling, the liquid being kept well diluted with water. After filtration, hydrogen sulphide is passed into the filtrate at intervals for three days to convert the arsenic into the insoluble sulphide. After filtration the precipitate (including the filter paper) is taken to dryness with excess of nitric acid, sulphuric acid is added, and the whole gently charred, care being taken to avoid loss of arsenic through overheating. The char is extracted with hot water and filtered; the filtrate is reduced with sulphur dioxide obtained from potassium metabisulphite and sulphuric acid, and boiled to remove excess of sulphur dioxide. Hydrochloric acid is added, and the liquid is again saturated with hydrogen sulphide for three days. The precipitate after purification is weighed on a tared filter, after drying at 110° C. The precipitate of sulphide of arsenic is of a canary-yellow colour, and quite small traces of many other metals will markedly darken it. This generally forms a simple means of determining purity. As a rule, the only impurities likely to be present are copper and mercury. To remove these dissolve the sulphide of arsenic in a solution of sodium sulphide (use ammonium sulphide if mercury is present), filter, re-precipitate the arsenic sulphide, which will be in the filtrate, with hydrochloric acid, and saturate again with hydrogen sulphide. Filter through a tared filter and wash the precipitate with water containing hydrogen sulphide, alcohol, ether, carbon bisulphide, again ether, and dry as above.

(2) *Unweighable Traces.*—Traces of arsenic are estimated by Marsh's method, but in place of the older method of using zinc and sulphuric acid as the source of the hydrogen, the electrolytic method apparatus devised by Thorpe will be found satisfactory. He uses platinum poles and a conducting fluid of 1 in 8 sulphuric acid, which requires a current of 5 ampères and 15 volts for two apparatus in series. This method, although probably not so sensitive as the zinc method, will be found quite reliable, and a set of standard mirrors of known amounts of arsenic made by the same apparatus will form the means of comparison. Such an apparatus, although expensive to purchase owing to the cost of the platinum, will with care last a lifetime. To obtain the arsenic in a suitable form for this method, the tissue is taken down to dryness with nitric acid, and afterwards gently charred with sulphuric acid and heat, the char extracted with hot water, filtered, and reduced with sulphur dioxide as given above, care being taken to remove all excess of sulphur dioxide by boiling and concentrating to a low volume (25 to 50 c.cm). An aliquot part of this (corresponding to a known number of grammes of viscus taken) is introduced into the Marsh apparatus, which has been running for 30 minutes to prove the absence of arsenic in the apparatus, &c., and in from half to three-quarters of an hour the complete mirror will have formed. The mixture of hydrogen and arseniuretted hydrogen, evolved by means of the electric current is passed through lead acetate paper and pieces of calcium chloride, and the tube through which the gases pass is heated with a bunsen burner to decompose the arseniuretted hydrogen and allow the arsenic to deposit, as in the original Marsh method. By this means 1/500 of a milligramme of arsenic may be detected, and amounts ranging from 1/10 to 1/100 of a milligramme may be accurately estimated, so that such quantities of the viscus should be taken to ensure the amounts coming within this range. This method has been subjected to criticism on the grounds that the platinum electrodes may alter their sensitiveness resulting in different-sized mirrors from solutions containing the same amounts of arsenic. There is a certain amount of

truth in this statement, but the alteration is not a sudden change, and from time to time controls by means of fresh standards may be made. I have been able to improve the sensitiveness of the platinum poles by passing the current through the apparatus reversed, after which the poles have shown distinct signs of improved sensitiveness. Lead electrodes are recommended in place of platinum ones, as they are stated to be more sensitive, and minute traces of arsenic are more completely converted into arseniuretted hydrogen. This is true; but if lead is used, there is a possible risk of the lead containing traces of arsenic, and consequently platinum is preferable.

I have always found the amount of arsenic to be evenly distributed throughout such an organ as the liver; thus, by a simple calculation, the amount for the whole organ is easily ascertained. The intestines are the only parts of the body in which the content is liable to variation, which naturally occurs when the dose of arsenic is passing through the alimentary canal.

*The Marsh, Gutzeit, and Reinsch Methods Compared.*

The Gutzeit method of estimation and its modifications are delicate and useful when the source of the hydrogen is obtained by electrical means, but when zinc is used they are open to the objections cited above. The Gutzeit method depends on the liberation of gaseous arseniuretted hydrogen, which is brought into contact with filter paper impregnated either with silver nitrate, as in the original Gutzeit method, or with mercuric chloride, as recommended by the British Pharmacopœia; in both cases a dark stain is formed on the paper (standard stains are made with known amounts of arsenic). There is probably little to choose between the sensitiveness of the Marsh and Gutzeit methods, but I prefer the comparison of the mirrors in the Marsh method to the stains on the paper in the Gutzeit method. In the Gutzeit method the tissues must be broken up by the nitric and sulphuric acid technique, as given above, and the gases evolved in the apparatus must be passed through lead acetate paper or pumice impregnated with lead acetate, as a certain quantity of hydrogen sulphide is liberated during the passage of the current, this gas in itself being capable of producing a dark stain on the paper impregnated with the silver or mercury salt.

A further modification of Gutzeit's method, useful except for very minute traces, consists of passing the gases evolved through a known volume of a standard solution of silver nitrate. The arseniuretted hydrogen combines with the silver nitrate, forming metallic silver, and the excess of silver nitrate left over is determined by titration. I have had no personal experience of this method, but am favourably disposed towards it. The British Pharmacopœia recommends an arsenic limit test by a modified Gutzeit method, using zinc, but here it must be recognised that any error from this source is in favour of the consumer of the drug; further, the analytical methods given in the Pharmacopœia are supposed to be within the scope, and the apparatus at the command, of the holder of the minor certificate of the Pharmaceutical Society.

The Reinsch test is purely qualitative, but is a very valuable confirmatory test of the presence of arsenic, and should never be omitted if there is sufficient arsenic present. Its delicacy is intermediate between the gravimetric method and the Marsh and Gutzeit methods, and it has the advantage of only requiring two reagents—hydrochloric acid and copper foil. The technique is too well known to require discussion here.

When we are dealing with a substance so widely used as arsenic, it becomes of paramount importance that its toxicological phenomena should be studied not only in the greatest detail, but with the greatest possible accuracy. Unless the methods of analysis can be placed absolutely above suspicion, the resultant controversy will lead to deductions based on inaccurate work, and to a great waste of valuable time.

In conclusion, I would like to thank Mr. John Webster for his helpful criticism.

## MEDICINE AND THE LAW.

*Recovery of a Retaining Fee.*

IN the Eastbourne County Court recently a medical practitioner sued a married man under an agreement alleged to have been made by the plaintiff with the defendant's wife, whereby he had undertaken at her request to attend her in her coming confinement. The patient, in spite of this arrangement, had been eventually attended by another medical man at her confinement and during her convalescence, and the plaintiff claimed £2 2*s.* for a retaining fee, the defendant having repudiated all liability. After argument as to the nature of the contract and as to its effect as binding the defendant husband, the county court judge found in favour of the plaintiff for the amount of his claim, £2 2*s.*, and costs. The fairness of a claim in these circumstances is obvious. A contract to attend a patient for so definitely expected an event as the birth of a child naturally involves such arrangements on the part of the medical practitioner as will ensure his being able to fulfil his part, and he may have to alter his plans for a holiday or for other temporary absence from home in order to carry out his side of the bargain. It is satisfactory to note that the claim, if disputed, can be vindicated in a court of law.

*Surgeon and Coroner.*

An inquest was held at Scarborough recently upon the body of a domestic servant, 28 years of age, who was being treated for Graves's disease and had died in Scarborough Hospital as the result of an operation. The coroner found a verdict to the effect that death was due to Graves's disease, cardiac asthenia, and to operation. In doing this he is reported to have added that the operation was a mistake, and ought not to have been performed without consultation with specialists. We submit that the coroner was not justified in thus censuring the medical practitioner who was responsible for operating. The practitioner himself had deposed that death was not due in any way to the anæsthetic, but to cardiac weakness aggravated by the operation. He had frankly acknowledged that there was a risk, but he had explained to the patient that without operation she must have died in two or three years, and had obtained her consent. The coroner's comment upon this was that in three years' time surgical science might have advanced, and that it would have been different if it had been a case of days. In his judgment it was "a pity and a mistake" to operate. The rejoinder of the medical witness, Dr. L. S. Debenham, to this was: "Then I was to let the girl drift to her death within three years, when the span of life is three score years and ten." It is to be noted that the coroner does not appear to have relied himself upon the evidence of any specialist to the effect that the operation should not have been performed in the condition in which the patient was at the time. She was of full age, and if it was clearly put to her that some risk to her life would be involved, it can easily be understood that she accepted it, in lieu of the certainty of continued illness and death, perhaps, if she was friendless, in a Poor-law infirmary. In such cases responsibility must inevitably continue to be shouldered by surgeons. It is a hardship, also apparently inevitable and therefore to be cheerfully borne, that they should have to submit to criticism at the hands of persons less qualified to judge than themselves.

*Bogus Doctor as Locum Tenens.*

The Medical Defence Union were successful recently in prosecuting at Wimbledon police court James Allport, an unregistered person, described as a "pathologist," who, among other fraudulent proceedings, had obtained the post of locum tenens for a week to a medical practitioner at a fee of nine guineas, with board and lodging. He had also obtained unlawfully a kit-bag and surgical instruments from Messrs. Arnold and Sons, and a microscope from the City Sale and Exchange Company. To a member of Messrs. Arnold's staff he had described himself as

L.R.C.P. Considering the serious results to life and health that may arise from an unqualified person passing himself off as a doctor, the sentences imposed on Allport seem hardly adequate. He was fined on one charge £20, with three months' imprisonment as an alternative, and ordered to undergo imprisonment for three months on the other, a possible total of six months' removal from the scene of his activities.

## NOTES FROM INDIA

(FROM OUR OWN CORRESPONDENT.)

*Medical Inspection of Schools.*

No comprehensive scheme for the medical inspection of school-children in the Madras Presidency has been brought into working order, although tentative proposals have been under consideration for some years past. For various reasons the work involved in such a scheme has been shelved to a great extent, but individual schools here and there have had the benefit of medical inspection. From the report for 1921 of the Director of Public Instruction it appears that 143 schools appointed medical inspectors during the year, and 11,786 pupils were examined (the total number of pupils attending school is nearly two million). Sixty-three reports from medical inspectors were received. Government in 1920 sanctioned the deputation for a period of two years of three special assistant surgeons, with headquarters at Madras, Rajahmundry, and Coimbatore respectively, to work under the orders of the Director of Public Instruction; their chief duties will be to inspect pupils in Government secondary schools and secondary schools attached to Government colleges, to supplement the work of local medical practitioners employed in aided institutions, and to correlate the inspection of schools by local medical practitioners. These assistant surgeons have not yet been appointed; on their appointment the department intends to publish a separate report on the results of the medical inspection of schools, based on the work of the assistant surgeons and on an examination by them of the reports received from medical inspectors. The appointment of a permanent medical inspector is under consideration. The financial position has prevented any further advance being made in this important branch of public health work, but the few inspections already made will probably prove conclusively that a great extension of the work is urgently called for.

*District Health Staffs.*

In connexion with the formation of a district health staff for each district in the Madras Presidency, the Government have issued an order regarding deputy inspectors of vaccination and sanitary inspectors of cholera parties, who will together form the majority of the members of these staffs. All deputy inspectors of vaccination are trained sanitary inspectors, and there are no obvious advantages in maintaining two distinct classes of officers with more or less the same qualifications for dealing with two different diseases. They have therefore decided to amalgamate the two services, and pay them according to a uniform scale which is shown below: (1) General scale: Rs.60–5–120; (2) selection grade: Rs.125–5–150. The number of appointments in the selection grade will be fixed at 15 per cent. of the total strength of the service. Deputy inspectors of vaccination will hereafter be designated sanitary inspectors. As service in cholera parties involves a certain amount of risk, members of the amalgamated service who work in such parties will be granted a special pay of Rs.10 per mensem in addition to their regular pay.

*The General Hospital, Madras.*

In spite of financial stringency the hospital requirements of the headquarters of the Presidency are not being overlooked; a recent report in the *Madras Mail* gives details of an inspection of the Madras General Hospital by the Hon. the Rajah of Panagal, Minister for Local Self-Government, in charge of the medical portfolio. The Minister was received by Col. W. R. J. Scroggie, I.M.S., superintendent of the hospital, and went through the building noting its work and equipment in detail. In speaking of his impressions of the hospital, the Minister owned to having been at one time sceptical of the wisdom of erecting a new general hospital for Madras on the Spur Tank site; but, he said, after seeing the antiquated condition of the present hospital buildings, and realising the adverse circumstances under which the staff have to work in it, he had changed his ideas and realised the great need for a new general hospital, in every way worthy of the reputation which Madras has achieved for the efficiency of her medical institutions. It was quite unreasonable to expect the present building—built more than a century and a half ago, in the days of the East India Company—to serve the needs of an up-to-date hospital in the midst of a progressive community. Accommodation for the growing numbers of both in- and out-patients was, in his opinion, not only inadequate, but even unsuited in several respects. The cooking and latrine arrangements in the several wards were miserable; the ground floor was covered with bricks of very old fashion, subject to the action of tinctures and acids, and impossible to keep clean. The operation theatres were far inferior to the theatres in some of the hospitals in mofussil districts. The out-patient department seemed to be very poorly equipped; and the absence of a casualty department, essential in a hospital of the high reputation of the Madras General Hospital, was very much to be deplored. Residential quarters for the nurses in the hospital seemed to him another urgent want. Nurses are now accommodated on the second floor of the hospital; if they were given separate accommodation, the second floor might be used as special or general wards. An electric lift to replace the one now worked by manual power, he felt, was also necessary if the hospital equipment was to be brought up to date.

*Danish Mission Hospital.*

The foundation-stone of the new extensions to the Danish Mission Hospital at Tirukoilur, in South Arcot district, was laid last week by the Rev. Mr. Hoff, in the presence of a large gathering of officials, non-officials, and mission workers. Before the ceremony was performed, Dr. S. Dalmar, medical officer in charge, read a brief report on the working of the hospital since its opening in 1913. The hospital, she said, owed its existence to the spirit and self-sacrifice shown by nurses in Denmark, who had collected the necessary money for a woman's hospital in India. A new operation theatre, a laboratory, and new isolation rooms and wards were needed; she hoped that the people of South Arcot would come forward with liberal donations and help the mission authorities to complete the work.

## ROUMANIA.

(FROM OUR OWN CORRESPONDENT.)

*A Public Health Campaign in the Vajdasàg.*

THE Vajdasàg is a large district in the southern part of old Hungary, now belonging to Jugo-Slavia, and lying between Hungary and Roumania, to the north of the old Serbia. The population consists mainly of rich and intelligent agriculturists, who are able to appreciate the importance of sanitary reform. The sanitary board of the Vajdasàg—an independent body appointed by the Ministry of Public Hygiene in Belgrade—led by the physician and medical author Dr. Lazar Markovics, established in 1920 at three cities in the district—Szabadka (population 160,000), Ujvidék (100,000), and Nagybecskerek (70,000)—free dispensaries where all are admitted without distinction of nationality or financial condition, free medical treatment and medicines being provided. There are specially equipped dispensaries for the tuberculous, for venereal diseases, for child welfare, and for trachoma—this disease being very common in the district. At the venereal disease dispensaries salvarsan is given in any quantity required; this type of dispensary is equipped with a blood-testing laboratory, patients

being kept under observation for years. Supplies of salvarsan were small at first, but Jugo-Slavia has now received large quantities of the drug from Germany as part of the reparation payments. In Jugo-Slavia the deaths from tuberculosis amount to 60,000 a year—a figure representing 10 per cent. of the incidence—and new dispensaries are to be erected in other large towns of the Vajdasàg (Versecz, Pancsova, Fehértemplon, Zombor, Zenta, &c.) as a means of establishing direct contact with the diseased poor. Extensive hygiene propaganda has also been started and hundreds of thousands of simply written circulars have been distributed amongst the people. Free lectures are delivered, illustrated with lantern slides and kinematographic films.

*Popular Hygienic Instruction.*

A number of popular dramas have been written introducing alcoholism, venereal disease, or tuberculosis, and free performances of them are given. Dr. Velicskovics Miladin, a celebrated medical man and member of the Chamber of Deputies, has been responsible for two of these propaganda plays. One of the latter, entitled "He has broken his Oath," was played at the National Theatre in Belgrade; in it a doctor breaks the oath relating to keeping the secrets of his patients, in order to save a girl from marriage with a syphilitic. Lecturers are now sent, in charge of motor lorries mounted with kinematographic apparatus, to tour the country districts, showing their films and lecturing in the villages. The medical men in charge of these expeditions also visit one or two families in the villages to ascertain the sanitary conditions under which they live; not uncommonly human beings are found sharing their houses with cattle or goats. If necessary the inspector supplies lime to whitewash rooms, soap, or linen for the baby. If the manure or rubbish heaps are very near to the dwelling-house or the well, he has them removed whilst he stands by. If a well is polluted he has it closed, and leaves an expert staff to bore an artesian well. The rumour of these rapid sanitary reforms spreads quickly, and serves as a very efficient means of propaganda. Dr. Markovics, chief sanitary officer in the Vajdasàg, believes firmly in preventive methods, and is already introducing the rudiments of hygiene into the curriculum of the elementary schools. Besides the child welfare dispensaries, nurseries have been established in the towns where working women can leave their infants early in the morning, and where these babies are medically examined, fed, bathed, and cared for till evening, when their mothers take them home. There are also open-air schools, where poor children are taught, fed, bathed, and allowed to travel free by tram to and from their homes. Their clothing and footwear are supplied by charitable societies.

*The Danger of Imported Cholera.*

A short time ago in the Crangas district of Bucharest an innkeeper's daughter fell ill with the symptoms of cholera, and died; a bacteriological examination, carried out in the city laboratory, proved the disease to be Asiatic cholera. Dr. Skupieski, sanitary adviser to the city authorities, immediately made arrangements for disinfection, and also for inoculation of all persons living in suspected dwellings in the immediate neighbourhood. The strictest personal cleanliness was enjoined, and circulars were distributed containing information about the disease. Unfortunately, the recent heat has had a disastrous effect on the water-supply. Five other cases were reported shortly afterwards, all of which proved fatal. The Crangas district is now isolated and quarantined; the source of infection was discovered to be in Bessarabia, and a very strict quarantine has been established for travellers coming from this province. Sporadic cases have also been notified in the country, the infection being traced in each case to Bessarabia. Orders as to the cleanliness of outdoor premises, disposal of rubbish, disinfection of closets and latrines, washing of linen, sale of unripe fruit, &c., have been issued in all cities and towns. The sanitary inspectors and police have instructions to enforce the strictest obedience to these orders.

# HEALTH RESORTS ABROAD.

## III. THE WESTERN PYRENEES.

SOME years ago Prof. Landouzy organised a series of visits to the more important health resorts in the various districts of France. These excursions have come to be well known as the "Voyages d'Études Médicales," or the V.E.M. This year, the sixteenth of the series, the visit was directed to the South-West of France and included the most important health resorts and spas in the Western Pyrenees. The general secretary and organiser, Dr. Maurice Gerst, of Paris, had evidently given much care to the programme and a highly successful tour resulted. The members assembled at Arcachon on August 27th, though a preliminary excursion to Bordeaux on the 26th and to some of the important preventive sanatoriums for children in its neighbourhood attracted a considerable number of those taking part in the tour. On the 28th Dax and Préchacq-les-Bains were visited. The latter, a small spa, charmingly situated and well organised, affords treatment for chronic "rheumatic" conditions similar to that at Dax and seems likely to develop into an important and useful station. Two days were spent at Biarritz, and visits to Cambo, Hendaye, and St. Jean-de-Luz were arranged. Leaving Biarritz on August 30th, Salies-de-Bearn was inspected on the way to Pau, where one night was spent. Next day St. Christau was visited, en route for Eaux Chaudes and Eaux Bonnes. St. Christau is of special interest from the fact that the waters contain copper and are said to be of special value in conditions such as leucoplakia. Eaux Bonnes and Eaux Chaudes both possess thermal establishments and afford excellent opportunities for visiting some of the beauty spots of the Pyrenees. On Sept. 1st the party left Eaux Bonnes in motor-cars and drove along the magnificent "route des Pyrénées," over the Col d'Aubisque to Argelès and thence to Lourdes, where special facilities were offered to the members to visit the grotto and the bath, and to examine the cases. The same evening the party reached Cauterets and next day proceeded to Luz St. Sauveur, a spa with a reputation for the treatment of sterility and uterine conditions. Next day an excursion was arranged to the celebrated Cirque-de-Gavarnie, and it was hoped that some members of the party would make the ascent of the Pic du Midi, but unfortunately a heavy fall of snow rendered this impracticable. Two days were then spent at Bagnères-de-Bigorre. On Sept. 5th Capvern was visited, and then after a drive over the route des Pyrénées and the Col d'Aspin, through most beautiful mountain scenery, Luchon was reached. After a visit to the bathing establishment and an excursion to Superbagnères, the party broke up, though some members availed themselves of the opportunity to go on to Toulouse, brief visits being arranged to Siradan and Barbazan en route.

The tour was made under the scientific direction of Prof. Paul Carnot, of Paris, aided by Dr. F. Rathéry. Short lectures were given by one or other of these at each of the stations visited, which added materially to the value of the tour. The numbers are limited to 150 and a certain quota of foreign medical men are permitted to join. A considerable number of Scandinavian practitioners, especially Danes, availed themselves of this opportunity, but there were also representatives from Belgium, Holland, and Italy, among the latter being Prof. Sanarelli. Seven British medical men joined the party and all were impressed with the beauty and grandeur of the Pyrenees, the variety and value of the medicinal springs, and the cordiality of their French confrères. We heartily congratulate Dr. Gerst, Prof. Carnot, and Dr. Rathery on the success of these tours, which should be more widely known in this country.

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THE LATE DR. J. T. MORGAN, J.P.—Dr. John Thomas Morgan, who died at his residence at Aberystwyth on August 30th in his eightieth year, received his medical education at St. George's Hospital, London, becoming M.R.C.S. in 1865. He was a justice of the peace and Deputy-Lieutenant of Cardiganshire.

# Public Health Services.

## CONSULTATION IN INSURANCE PRACTICE.

A MEMORANDUM (Memo. 281), issued to approved societies by the Ministry of Health, deals with an important extension of duties on the part of the regional medical staff. Henceforth, references to these officers will be accepted from all parts of England and Wales. Furthermore, and this is the new feature, such references may include not only as heretofore those in which an approved society desires advice on a question of incapacity for work, but also references for further medical advice. If the number of persons to be examined under both these heads should prove more than the whole-time officers can cope with, private practitioners of suitable experience will be employed as referees in a part-time capacity. It is already open to societies to refer cases in which an insured person has been continuously in receipt of benefit for at least four weeks and in which they think it desirable that the insured person should be seen by a regional medical officer in consultation with the insurance practitioner responsible for the medical care of the patient—with a view to expediting the restoration of working capacity. By this new provision the progress and treatment of any case of prolonged illness may be brought under review, so that in consultation difficulties in diagnosis and delay in provision of the most appropriate treatment may be fully considered. The object of the new procedure is primarily the welfare of the insured person, his speedy return to work, and secondarily the economy of insurance funds for the provision of special benefits. The memorandum authorises the employment of specialists when found necessary by the regional staff to assist them in dealing with cases for which special experience is requisite.

## "INCAPABLE OF WORK."

Another memorandum (Memo. 280 A/I.C.), issued by the Ministry of Health to insurance practitioners, deals with the meaning of the statutory term "incapable of work." From the practical point of view the phrase has been found difficult to interpret, and if used with scientific precision would be inapplicable to the great majority of cases. The memorandum does not pretend to give a legal definition but is simply a summary of views generally accepted by those responsible. As such it will be found useful to the practitioner. It was usual before the Insurance Act for certificates of incapacity to be worded ". . . . unfit to follow his usual occupation," and in practice this is still the common interpretation of the words "incapable of work." An insured person has been regarded as "incapable of work" when in such a condition, through some specific disease or bodily or mental disablement, that an attempt to work *would be seriously prejudicial to his health*. The criterion of inability to follow his usual occupation is sufficient for the ordinary case of short illness. An insured person is regarded as incapable of work if it appears likely that he will soon be able to resume his former work, and that it would therefore be unreasonable to expect him to undertake any other form of work in the meantime. In cases of chronic and disabling illness a new criterion must be adopted. At varying stages in the course of different diseases, or after the occurrence of particular injuries, it will become clear that there is no reasonable prospect of the patient again becoming able to resume his former occupation. When this condition of permanent incapacity to resume the previous occupation has supervened, a different criterion from that of fitness for ordinary occupation must be applied and the patient should not be certified as "incapable of work" unless in the doctor's opinion he is physically unable to perform any other kind of suitable remunerative work, whether at once or after a short course of training. Finally, the question of incapacity due to pregnancy is dealt with. Pregnancy even in the later stages does not necessarily render an insured person "incapable of work." Each case must be individually considered and all the circumstances both of physical condition and the nature of the employment taken into account in the decision. The memorandum is welcome as a concise statement of certain main points on which general agreement has been reached.

## REPORTS OF MEDICAL OFFICERS OF HEALTH.

### A GROUP OF COUNTY DISTRICTS.

THE table which follows gives the principal health statistics in a number of counties and county districts. It will be noted that the general death-rate, the infant mortality, and the diarrhœa death-rate are, as a rule, lower than those for the whole country. Speaking generally, the cancer death-rate is about the same as that of England and Wales, but the rates in Herefordshire, West Suffolk, Northamptonshire, and Dumfries are notably higher. Thirty years ago the phthisis rate used to be double the cancer rate. Now the position is frequently reversed. Herefordshire and West Suffolk show high phthisis rates. The infant mortality rates would have been thought wonderful 20 years ago, and the rise in the diarrhœa rates, due to the hot dry summer, has been comparatively slight.

| Counties. | Estimated population for 1921. | Birth-rate. | Death-rate. | Infant mortality rate. | Diarrhœa and enteritis rates (ages 0–2) per 1000 births. | Phthisis death-rate. | Cancer death-rate. |
|---|---|---|---|---|---|---|---|
| Warwick .. | 343,045 | 22·3 | 10·7 | 65 | 15·0 | 0·63 | 1·23 |
| Surrey .. .. | 733,338 | 17·5 | 9·7 | 55 | 10·9 | 0·61 | 1·33 |
| Leicester .. | 262,527 | 21·7 | 11·3 | 71 | 10·5 | 0·77 | 1·18 |
| Northants .. | 212,270 | 19·6 | 11·8 | 72 | 6·5 | 0·80 | 1·45 |
| Hertford .. | 332,220 | 18·5 | 9·9 | 50 | 8·1 | 0·71 | 1·23 |
| West Suffolk .. | 108,982 | 20·6 | 12·4 | 57 | 6·7 | 1·08 | 1·56 |
| West Glo'ster* | 47,679 | 23·3 | 10·4 | 62 | 11·6 | 0·52 | 1·2 |
| Hereford† .. | 50,100 | 20·9 | 12·6 | 51 | 3·8 | 1·06 | 1·6 |
| Dunbarton‡ .. | 54,793 | 23·1 | 12·3 | 61 | 7·2 | 0·79 | 1·0 |
| Fife‡ .. .. | 110,016 | 26·9 | 11·7 | 82 | 7·4 | 0·42 | 1·2 |
| Dumfries‡ .. | 45,547 | 23·8 | 11·0 | 69 | 6·5 | 0·9 | 1·4 |
| Engl'd.& Wales | 37,885,242 | 22·4 | 12·1 | 83 | 15·5 | 0·88 | 1·2 |

* United districts. † Combined district. ‡ Excluding burghs.

*Warwickshire.*—Dr. A. Hamilton Wood reports that a little has been done to prevent river pollution, but that a great deal more needs to be done. The Tame is grossly polluted in Staffordshire. The Anker is polluted by the sewage effluents of Nuneaton, Hinckley, and Bedworth, and representations have been made to the Leicestershire County Council with regard to the serious pollution caused by the Hinckley sewage works, which appears to be largely due to the trade waste from the local dye-works. The call for economy has prevented the extension of the Rugby sewage works and purification of the River Avon. Improvements have been effected at the sewage works of Coventry, Kineton, and Wellesbourne. Of 497 samples of milk 53 were reported to be adulterated—a high percentage. The average composition of all samples, including those adulterated, was 3·66 of fat and 8·82 of non-fatty solids—well above the legal limits. Progress has been made with the provision of the new sanatorium (150 beds) which is being erected at Hertford Hill, Warwick, in memory of King Edward VII.

*Surrey.*—Dr. Joseph Cates complains of the failure to notify cases of tuberculosis. The 64 shelters provided by the county for loaning to patients who have had courses of institutional treatment are in constant use. Some of the health visiting is at present done by district nurses. Dr. Cates does not find this satisfactory, and a reorganisation scheme is being carried out by which this will be no longer necessary and by which also overlapping will be avoided and greater efficiency secured. Dr. Cates points out that recent decisions have rendered the Sale of Food and Drugs Acts inoperative as regards milk adultera-

tion, and mentions one case in the county where the farmer was supplying milk 25 per cent. below the fat standard and using the "strippings" for feeding his calves. The school report shows that there is a decline in the percentage of children accepting treatment for dental defects. Educational lectures to parents are being given by the school dentists with the hope of removing apathy and ignorance in this important matter.

*Leicestershire.*—Dr. T. Robinson reports that the borough of Loughborough and all the urban and rural districts in the county have been combined to form one isolation hospital district, but regrets that the scheme for the erection of buildings for the accommodation of advanced consumptives at several of the isolation hospitals has been indefinitely postponed for reasons of economy. Dr. Robinson is inclined to think that the V.D. clinic established at Loughborough suffers in popularity from the fact that patients prefer to go to a larger centre from motives of secrecy. Six women, treated during pregnancy, have given birth to children free from signs of the disease. The drought caused some trouble, and a proper water-supply is urgently needed for Melton Mowbray, Asfordby, and villages in South-West Leicestershire. Dr. Robinson reports that "the condition of much of the milk sold is disgusting." He does not oppose "Grade A" regulations, but would like something simpler that could be enforced without delay. Little has been done in the way of housing schemes and overcrowding gets worse.

*Northamptonshire.*—Dr. Charles E. Paget reports that Rushden House has been converted into a sanatorium for early, middle, and advanced cases of consumption, and that 50 county patients were in residence at Christmas. The county came through the drought fairly well. About 1500 houses have been erected since the war, but this does not meet the full housing requirements in every area. The districts of Kettering, Desborough, and Rothwell some years ago formed a joint committee for the regular veterinary examination of dairy cattle and this example has been followed in other districts, but such inspection is not yet general in the county. In some districts it is mentioned that, while the cowsheds are fairly good, no attempt is made to keep the cows clean. Of 263 samples of milk, 30 were unsatisfactory and utterly inadequate penalties were inflicted in the convictions for "added water." Dr. Lila S. Greig, the maternity and child welfare medical officer, reports that for some three months the free milk scheme was in abeyance and that the unemployment and resulting starvation have worked havoc with breast feeding during the year. She thinks insufficient nourishment of the mother does not affect the supply of breast milk for the first three months, but that after three months the milk is lacking in fat.

*West Suffolk.*—Dr. A. H. Bygott draws attention to the serious nature of the depopulation of rural areas, and points out that the depletion of West Suffolk which has occurred since 1911 is equivalent to the disappearance of a large village of 792 inhabitants every year. Provision for advanced consumptives is needed in the county and also for tuberculous children. There was no serious complaint of water shortage in the small towns, though the supply had to be restricted, but there was trouble in villages supplied by wells. The most important water event of the year was the promotion of the South-East Essex Water Bill, with the intent of taking water from the Stour. The Bill was rejected on the ground that the water is not necessary for South Essex at the present time. Dr. Bygott thinks the scheme will be revived and that, if it is, the water authorities which get the water should be liable to make a payment towards the purification of this Suffolk river. The pollution of the Stour by the effluent from a flax factory led to an inquiry during the year. As an outcome the Rossi process is to be installed in the hope that the liquor thus produced may be less objectionable. The council has erected 361 new houses under housing schemes. The rents asked are high and the result is that "some of these houses, erected at enormous cost, are now unoccupied or are occupied by good tenants—middle-class people with small or no families—and the workman with children remains just as he was." Dr. Bygott says there is urgent need for careful inspection to keep existing houses in better repair, although it is urged on the other hand that inspection is practically useless, because the landlord cannot afford to do the repairs.

*Hertfordshire.*—Dr. H. Hyslop Thomson refers to the rat and fly nuisance from refuse dumps and complains of the three large dumps for London refuse in the county. He mentions the occurrence of two cases of epidemic jaundice near one of the dumps and that this disease is supposed to have been contracted from infected rats. Health visiting in the county is carried out by health visitors appointed by the county council in certain urban districts and in the remaining districts by the nurses of the District Nursing Association. Dr. Thomson states that the reports as to home conditions, &c., forwarded by the district nurses are of great value to the health authority, and is also of opinion that the making of such reports is of value to the nurse herself.

*West Gloucestershire United Districts.*—Surg.-Capt. O. W. Andrews is well satisfied with the infant mortality rate, despite the hot summer, prolonged drought, and the adverse conditions produced by the prolonged coal strike. The only deaths, 12 in number, from diarrhœa under 2 years of age were in the East Dean district. Dr. Andrews is very emphatic as to the advantages of summer time to everybody, especially to children, and hopes "this great triumph of common sense over ignorant prejudice has been secured definitely for the future."

*Herefordshire Combined District.*—Dr. Herbert Jones draws attention to the comparatively large number of occupiers of houses who pay no rent. In many cases the owner would gladly close the house, but allows it to be occupied because no better house is available. The housing schemes which provided for 455 houses were abandoned on instructions of the Ministry after the completion of 96. Dr. Jones points out that unless more houses are repaired and new ones erected housing conditions are bound to get worse as the years go by, in spite of the decreased population in four of his six districts. Hop-pickers to the number of about 12,000 come into five of the districts during the season from Staffordshire, Cheltenham, Worcestershire, and South Wales. An attempt was made in 1921 to secure local pickers, but failed, apparently owing to the cost of transporting the pickers from their homes in Hereford to the hop-yards.

*County of Dunbarton.*—Dr. T. Lauder Thomson draws attention to the low infant mortality rate of 48 in the western district with a population of 30,340 and a birth-rate of 23·2. What appears to be a very reasonable scheme for the supply of milk to mothers and little children has been drawn up in conjunction with the Board of Health. If it is at all possible one would like to know the relation between the cost of administering these schemes and the value of the milk distributed. Dr. Thomson reports an outbreak of small-pox at Duntocher in the eastern district at the time when small-pox was prevalent in Glasgow, and makes the incidental comment that, considering the intimate intercommunication between Glasgow and surrounding districts, the latter escaped extraordinarily well. The preventive effect of vaccination was specially well illustrated in the Duntocher outbreak. Of the 32 genuine cases, 17 were unvaccinated, and 11 had been vaccinated in infancy only, their ages being 40, 55, 45, 35, 36, 59, 60, 45, 19, 44, and 24. Of the remaining four cases, Mrs. M., aged 39, vaccinated in infancy and at 21 years old, had a very mild attack; J. G., aged 63, vaccinated in infancy and at age 48, had a very mild attack; J. M., aged 24, stated to have

been vaccinated in infancy and in the army, but showed no marks; and the last case, aged 25, unvaccinated in infancy and stated to have been unsuccessfully vaccinated in the army, also showing no marks. Seven of the 32 patients died, four were unvaccinated, two were the soldiers who had no marks and thus no evidence of protection, and the seventh was a man of 43 years, successfully vaccinated in infancy, who refused vaccination on three occasions when seen by Dr. Thomson.

*County of Fife.*—Dr. G. Pratt Yule reports a small outbreak of small-pox. The first case occurred in the burgh of Kirkcaldy and was buried undiagnosed. The sister and niece who had attended to the deceased developed the disease and the former died of it. Two female contacts who were of about the same age and whose exposure to infection was similar, were offered vaccination. One accepted and was successfully vaccinated. The other refused and died from virulent small-pox. The mining strike, which began on April 1st and lasted till June 30th, made maternity and child welfare work especially onerous in Kirkcaldy and Dunfermline. The "welfare" committees, by arrangement with the Board of Health, undertook the provision of food for necessitous expectant and nursing mothers and children under 5 years. The cost in Kirkcaldy was about £10,000, in Dunfermline £4174. Efforts were made to avoid overlapping between the parish council, the education authority, and the health authority. The general nutrition and health of the children are reported to have been never better than during the strike, and these good results are attributed to the plain wholesome fare (milk, oatmeal, soup, &c.) provided. The County Nursing Association, which is affiliated to the Q.V.J. Nursing Institute, has shown itself desirous of taking over the preventive nursing work of the public health authorities. Dr. Yule is absolutely opposed to this proposal. He considers that the sick must have the first call on the Nursing Association, that preventive duties will fall into abeyance, and that the theory that the leeway is made up when sick nursing is slack is not convincing. The rivers of Fife are apparently in a bad way as regards sewage pollution. The Ore, Leven, and Lyne are "almost classic examples of gross pollution." The Eden is also polluted and Loch Gelly serves as a sedimentation tank for the sewage of the burgh of Cowdenbeath, the sewage works of which have subsided owing to coal workings.

*County of Dumfries.*—Dr. J. Maxwell Ross reports that of 1082 births, 127 were illegitimate, and that the infant mortality rate for 1921 was 59·7 for legitimate and 141·7 for illegitimate infants. A V.D. clinic was opened at Kirkbank on June 1st and has been attended by 32 patients suffering from syphilis and 10 suffering from gonorrhœa. In a district like this the satisfactory treatment of gonorrhœa presents great difficulties, as daily attendance is extremely desirable in the early stages. Most of the housing schemes have been dropped on account of prohibitive prices, but 50 more houses at Kirkconnel have been allowed in response to a special appeal to the Board of Health, alleging that the overcrowding was showing its effect on the tuberculosis death-rate and on the infant mortality. Improvements of sewage disposal schemes are postponed till prices become more reasonable. The alleged pollution of the Nith by coal washings was found to be caused by water pumped direct from the pit, which is said to be frequently as dirty as the effluent from coal washers. Increase in the dairy trade makes it impossible for a part-time veterinary inspector to carry out the necessary inspections. In one successful prosecution it was admitted that, though one quarter of the udder was known to be the subject of disease, the milk from the other quarters was mixed with the milk from the rest of the herd and sent out for sale to a town in the north of England, where the milk was found to contain tubercle bacilli. The fine imposed for this offence was £3.

## SCHOOL MEDICAL SERVICE.

### A GROUP OF SEASIDE RESORTS.

*Brighton.*—In the code group 5700 children were inspected, and about half the parents attended. The attendance of parents was highest in the infant department, and lowest in the boys' school. The number of cases operated on for enlarged tonsils and adenoids was 362, the highest recorded since the provision for such treatment has been made. In only ten cases parents refused operation. The arrangements made for these operations are outlined by Dr. Duncan Forbes and are quoted here in view of the recent discussion on this subject:—

> Where operative treatment is considered necessary, arrangements are made, and printed instructions as to feeding, &c., before operation are given to the parent, and also instructions for the care after operation. The treatment is carried out in an isolated building at the entrance to the sanatorium. There are an operating-room, two small wards, accommodating four and five beds respectively, a lavatory and a waiting-room, and it is important to note that the wards and lavatory intervene between the operating-room and the waiting-room. The operation is performed by the senior school doctor, the assistant school doctor giving the anæsthetic, which consists of a mixture of two parts ether and one part chloroform. Before the anæsthetic, each child is medically examined as to its fitness. Two nurses are in attendance—one in the operating-room and one in the wards. Nine cases are treated at a session; the operations commence at 9.15 A.M. Before leaving, usually about midday, the doctors satisfy themselves as to the condition of the patients. The children are kept in bed till 4 P.M., the nurses being in attendance, when they are conveyed home by the motor ambulance of the infirmary, the nurses accompanying them to their homes. Any child who does not appear fit to travel is seen by the resident physician at the sanatorium, and, if necessary, is detained over-night in the isolation block. On the day after operation, each case is visited at home by a school nurse, who advises the parent and also notes the condition of the child. Further home visits are made if necessary. The child is brought to the clinic a week after operation, the condition of the throat noted, and the question of its fitness for school or otherwise settled. Children who have been operated upon are also seen a year later at the clinic.

The school nurse's visits at the home are welcomed, for, apart from showing that the child is still under observation, the nurse is often able to relieve parental anxiety. No fatality has so far occurred under this system. One girl required suture of the faucial pillars four days after operation on account of secondary hæmorrhage. 211 of the 290 children operated on in 1920 attended a year after.

*Margate.*—The total number of routine inspections here was 1094. Of the 166 children referred for treatment only 3 suffered from malnutrition, 59 were dental cases, and 37 had defective vision. All the 166 received treatment, surely a record, while 80 per cent. of the parents attended the examinations. During the year Dr. R. McCombe had a vigorous campaign against uncleanly heads which was set in action with satisfactory results. Dr. McCombe bewails the fact that it is after the summer holidays that this condition gives the greatest trouble, and puts it down to the hard work the mothers have to do during Margate's season, looking upon it as a local condition. But the filthy condition of the children's hair after the summer holidays is quite general all over England, and unfortunately must be ascribed to the relaxation of the vigilance of the school nurse during that period, which all goes to show what a very short way we have gone towards solving this difficult problem. There were 9 cases of ringworm of the head as compared with 46 the previous year. The improvement is ascribed to the prompt treatment by X rays. Under the old method of treatment each child would have been absent from school for at least 24 weeks—a long period of infectivity—now they return cured in four or five weeks. Ten years ago Margate had 63 cases of ringworm under treatment at the school clinic, only 49 of whom were cured by the end of the year, with a total loss of attendance of 5986 days. Treatment here follows inspection as the night the day. A sanitary inspector visits each

school every week; a sufficiency of towels and lavatory basins are provided in all schools with one exception, and altogether the health of the 3500 school-children is well cared for.

*Scarborough.*—The report for 1921 shows that in the code group 1722 children were examined. Dr. C. J. W. Tatham reports a distinct improvement in the cleanliness of the children during the year, 77 being found with unclean heads or bodies as against 130 last year. The number of cases of scabies was 36, and of ringworm 102. Both these diseases have spread since last year, and as there is no X ray treatment for ringworm they are responsible for many cases of prolonged school absence. The dental clinic is making itself felt. "At the older ages where formerly 50 per cent. of the children showed on medical inspection three or four or more carious teeth, now such a condition is the exception, and the majority have healthy mouths and all carious teeth are satisfactorily filled." Scarborough has a nursery school in Seamere-road, and a nursery class in Friarage schools accommodating altogether over 100 children; the school medical officer deplores the fact that from economical necessity these schools may be closed. It is unfortunate that an experiment of this nature should be dropped, especially when the school doctor reports on the nursery school as a most excellent institution, well managed, of great benefit to the children, and of special value to the mothers. Surely this is a sacrifice Scarborough can ill afford to make at the present time; the earlier the training in good habits begins the better the type of citizen produced.

*Torquay.*—During 1921 the routine inspections numbered 1407, apart from cases of dental defect, and over 20 per cent. were referred for treatment, 17 per cent. requiring further observation. The open-air school adjoining the Plainmoor Recreation Ground now accommodates over 60 children, and the results of this new venture appear gratifying. Attached to the school is a large garden, which, besides affording ample scope for gardening and open-air work, supplies the children with fresh vegetables during the year. The teaching staff numbers three. In addition there is a housekeeper who superintends the cooking and the bathing of the children, an assistant cook, a young girl who assists in the kitchen, and a man who acts as janitor, gardener, and the like. The actual cost of running this non-resident school for 60 children, aged 5–11 years, with a staff of seven, is not given. The dental work here is comprehensive, and 274 out of 389 cases requiring treatment received it. Including dental cases, of the total 500 children recommended treatment only 100 were left untreated by the end of the year.

### A GROUP OF MUNICIPAL BOROUGHS.

*Carlisle.*—Routine inspections during 1921 numbered 2749, and altogether 4631 children were examined, including over 1000 re-examinations. One-fourth of those examined required treatment, and in well over two-thirds of the cases it was obtained. The percentage of unsaveable permanent teeth found at routine inspection has fallen from 83 per cent. in the previous year to 71. The school dentist, however, still regrets the high percentage of parents refusing treatment for their children's teeth. The open-air class for delicate children appears to be justifying itself, but the figures showing gain in weight are of no value without a note of corresponding age and sex. The school clinics continue to do good work, the number of attendances being 25,887, with an average daily attendance of close on a hundred. Forty-two cases of ringworm were treated here by means of X rays.

*Colchester.*—To the housing of the public health department in more commodious and convenient quarters the great improvement in the school medical work for 1921 is attributed by the medical officer, Dr. W. F. Corfield. Certainly Colchester has made strides in this direction since the previous year. The parents are more willing and anxious for their children to attend the clinics, and the children are more diligently followed up. The number of attendances at these clinics was 3520. The examination of heads and bodies, especially the following up of these cases and their constant re-examination until clean, has yielded satisfactory results. Over 70 per cent. of the parents turned up at inspection. An interesting departure was the stammering classes of six weeks for ten children at a time. Thirty-two boys and five girls attended. For want of further cases the classes are now discontinued, with the exception of a revision class once a week, which ought to be of much service. Special remedial exercise classes for cases of spinal curvature were undertaken by the organiser of physical training for a period of six months. These cases were divided into classes: A moderate curve, B severe curve, C structural curve more or less permanent. In classes A and B, of 69 cases, altogether 27 showed marked, 23 moderate improvement, 17 no improvement, and 2 cases were decidedly worse.

*Eccles.*—During the year 2867 children were examined here in the routine group in addition to 1140 special cases. The increase in the number of defects is attributed by Dr. J. E. Spence to a higher standard of inspection. There were 90 cases of ringworm of the head. "Unless the number of attendances lost by children suffering from this condition can be reduced by an increase of children treated by X rays, it will be worth while considering the advisability of instituting special classes for children suffering from this disease." There were altogether 171 cases of enlarged tonsils and adenoids. These were divided into two groups: (1) Cases with moderately enlarged tonsils who were referred for operative treatment; (2) cases of moderate enlargement where the parents were advised to paint the tonsils with iodine and glycerine of alum. The latter group, which constituted the largest number of cases, were kept under observation. It will be interesting to know the actual results of this method of treatment. This report exemplifies the criticism [1] of a friendly Canadian official on a recent visit—the tendency to unnecessarily analyse and tabulate figures. Two tables are given, for spring and autumn respectively, in which the separate small schools averaging about 120 pupils are analysed into percentages with nits, vermin of head or body, dirty bodies, flea-bitten bodies, &c., A school, for instance, is figured as 0·8 per cent. dirty bodies on the strength of one child recorded. Figures like this are childish.

*Nuneaton.*—The total number of children inspected at routine inspections was 2307. The difference in the percentages of children found verminous—i.e., with nits and lice at routine medical inspection and at the nurses' surprise visits—is enlightening. The girls found in this condition during the nurses' inspection averaged 57 per cent. The number of cases of enlarged tonsils and adenoids requiring operation was 73. Unfortunately one patient, a girl, died at the school clinic of inhalation pneumonia about two days after the operation. An accident such as this is rare. There are 27 cripples among children of school age in Nuneaton, and Dr. Middleton Hewat presses for the proper treatment of these. As he says, it is money saved if a cripple child can be turned into an able-bodied self-supporting citizen. The school clinic still continues to do good work, and during the year 2708 children attended, making 6251 attendances for the year.

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## ASYLUM MEDICAL SERVICE.

The report of the *Belfast District Asylum* for the year 1921 derives much interest from the fact that the institution is planned on the "village colony" system. Eleven villas, each accommodating about 70 patients, are situated at various points on an estate of 500 acres, and the building of seven addi-

[1] THE LANCET, 1922, i., 340.

tional villas is contemplated. Tasteful and comfortable furnishing, with doors and windows kept widely open whenever possible, combine to give the rooms an appearance which a visiting official describes as "that of an hotel lounge rather than an asylum ward." The patients are allowed a considerable degree of freedom, even in some cases to the extent of visits to their relatives in Belfast. It is difficult to conceive any further step by which the surroundings of the insane could be made more congenial and conducive to recovery. A scheme of payment by patients' relatives according to their means has recently been instituted. From the statement of accounts it appears to have yielded only an average of about £4 per patient per annum, but a secondary effect of some importance has been an increase in the interest displayed by relatives in the asylum population.

The annual report of the *Cardiff Mental Hospital* contains allusion to many recent advances in the treatment of the insane. Built only 15 years ago on up-to-date and original lines, its already exceptional equipment was further amplified during its use as a general military hospital during the war, and includes extensive laboratories, rooms for electrical treatment and hydrotherapy, X ray and dental rooms, verandas for the open-air treatment of patients confined to bed, and a cinema theatre. Facilities also exist for the employment of suitable patients in such industries as weaving, and the making of mats, baskets, brushes, and boots. An out-patient department was instituted two years ago at the King Edward VII. Hospital, where discharged cases are seen from time to time, and a great variety of mental disorders encountered and treated, in patients referred to this department from elsewhere. In addition to the usual medical staff, the hospital has the services of two pathologists who have been responsible, individually and in collaboration with the two senior members of the clinical staff, for a large amount of important research, the results of which have appeared from time to time in various journals. To those not familiar with this work, a brief account appearing in this report of the results attained and of other work in progress will be of interest. The Cardiff Mental Hospital is one of the institutions which employ female nurses in the care of male patients. In six of the nine male wards the staff consists in each case of four nurses and one male attendant, and the infirmary wards are staffed by nurses entirely. This system, which is part of a general policy of "hospitalisation," is having its effect on the atmosphere of the wards and on the attitude of the patients.

The annual report of the *Kent County Mental Hospitals* refers to two institutions, those at Barming Heath and Chartham, accommodating 1172 and 1151 patients respectively. No important changes have taken place recently in either of these institutions. The appointment of an assistant matron at Barming Heath, whose time is to be devoted solely to the instruction of nurses, is an interesting step. In the list of officers at Chartham it appears that the posts of second and third assistant medical officer are vacant, and it is stated subsequently that the former had been so for four months, but no reference is made to the latter, nor are the salaries attaching to these posts stated. We can hardly believe that the medical superintendent acquiesces in a state of affairs by which he and one other medical officer are made responsible for the treatment of over one thousand patients. This is clearly a case in which the committee of management should take whatever steps are necessary, whether an increase in salaries, the provision of married quarters or of facilities for pathological work, such as will render the posts attractive to capable men. Much stress is laid in this report, which is one of unusual brevity, on the reduction of the maintenance rate (the cost per head per week is at present 24*s.* at Barming Heath and 26*s.* 6*d.* at Chartham), an object desirable only in its proper relation to the standard of accommodation and treatment.

# Obituary.

## SIR CHARLES RYALL, C.B.E., F.R.C.S.ENG.

Sir Charles Ryall, senior surgeon to the Cancer Hospital and to the Bolingbroke Hospital, whose sudden death is reported from Dornoch, was one of the most prominent of those surgeons whose activities are devoted mainly to the treatment of malignant disease. Born in 1870 at Brading, I. of W., son of the late Sir E. C. Ryall, A.M.D., he received his early education at Edinburgh and Dublin and later became a medical student at King's College Hospital, taking the conjoint qualification in 1894. After a period of post-graduate study in Paris he returned to England. For a short time he tried general practice, but after obtaining the Fellowship of the Royal College of Surgeons of England he entered upon the arduous work of a consulting surgeon in London. Once embarked upon this course he steadily forged ahead by dint of sheer hard work, pluck, and staying power. His appointment to the surgical staff of the Cancer Hospital when still a house surgeon marked the commencement of a new era in the treatment of malignant disease at this hospital. He also became attached to the London Lock Hospital, to the Gordon Hospital for Rectal Diseases, and to the Bolingbroke Hospital, as well as to several cottage hospitals in the neighbourhood of London, where his readiness to help at all times of the day and night rendered him indispensable. The result of his work bore fruit, and in 1914 he was elected a Member of the Council of the Royal College of Surgeons of England, a position which few attain who are not attached to a large teaching school. In this position it was soon discovered that he was an excellent organiser and a man of sound judgment and tact. On the outbreak of war the Government used his talents by placing him on the Advisory Medical Board for National Service, whilst the College of Surgeons nominated him a member of the Committee of Reference which dealt with many difficult questions connected with the medical arrangements at the London hospitals. He also acted as surgeon to King George's Hospital, and was chief assessor of the Board of Medical Assessors to appeal tribunals. In this capacity he dealt judiciously and sympathetically with the multifarious objections raised by appellants and was able to single out the real difficulties. For these services he was amongst the first medical men to be awarded the newly established C.B.E., and more recently he was made a Knight Bachelor. At the time of his death a further call was being made upon his organising powers, for he was acting as the British Secretary of the Société Internationale de Chirurgie, which is to meet in London next spring under the presidency of Sir William Macewen.

At all the hospitals to which he was attached Sir Charles Ryall did splendid service. He was a dexterous operator, speedy but not hurried, careful yet confident. His equanimity was wonderful, and no one in the operating theatre ever saw him lose self-control or utter a harsh or hasty word. Abdominal surgery practically grew with him, and he took no small share in the perfection of its technique. Ever on the look-out for improvements, he seldom returned from a holiday without something gleaned from visits to surgical clinics in this country or on the continent. His judgment was sound and he was not likely to be carried away by any unproved surgical fashions. It was said of him that he was the kind of surgeon that other surgeons would choose to look after them. His cheerful manner inspired confidence and hastened the convalescence of those under his care. His willingness to serve is shown by the offices he held as hon. secretary to the British Gynæcological Society, and member of council of the Obstetrical and Gynæcological Section of the Royal Society of Medicine. He was also a fellow of the Medical Society of London, a member of the

Société Internationale de Chirurgie, and a corresponding member of the Société Belge de Gynécologie et d'Obstétrique. He published various books and papers on different aspects of the cancer problem, but it was as a surgeon that his chief activities were spent.

It might be assumed at first sight that Charles Ryall was just such a genial, pleasure-loving, generous-hearted Irishman as might be expected from the rich brogue with which he spoke and that his social and professional success was the direct outcome of these qualities. In part, no doubt, they were, but underlying was a steadfastness of purpose and an earnestness of character well known to his numerous friends; though he entered on his career without influence and with but scanty means, these qualities brought him success. By his colleagues Sir Charles Ryall was beloved. He was always ready to encourage or help to the full extent of his power, and his personality was irresistible.

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### MATTHEW MITCHELL BIRD, M.D. DURH., M.R.C.P. LOND.

LESS than two years ago we chronicled the retirement from St. Mary's Hospital, Paddington, of the medical superintendent, who had occupied that position for over 30 years; now we learn of his sudden death. We offer sympathy where it belongs—that is, to all those trained at St. Mary's Hospital Medical School between the years 1888 and 1920.

Dr. Mitchell Bird, known to many generations of St. Mary's students as "Dicky," entered the medical school in October, 1883, winning a natural science exhibition. He qualified M.R.C.S. Eng. in 1887, graduated M.B., B.S. in the same year, and after holding posts as house physician and assistant anæsthetist was appointed medical superintendent of the hospital in September, 1888. In 1889 he took the M.D. Durham, and became M.R.C.P. Lond. in 1892. Devoid of personal ambition, Dr. Bird merged his life into that of the hospital and its school. His discretion as tactful administrator was patent to all, but few realised what a deep knowledge of disease in its more unusual manifestations was concealed under a modest bearing. Though he moved unobtrusively about his work, no one would have dared to take a liberty with Dr. Bird. Nominally, he was the medical superintendent assisted by 12 or 14 junior colleagues. Actually his position was more like that of the headmaster of a school where prefects are entrusted with the administration. In the interests of the training of his resident medical officers he made no attempt to prevent mistakes, but he was alert to protect the interests of the patients and the good name of the hospital when youth and inexperience threatened either. We need not recall to former residents at St. Mary's that "Dicky" was a source only of strength, never of terror in trouble, and that even the gruffest notes of his unexpectedly deep voice often concealed a chuckle. To the profession outside the medical school and hospital to which he devoted his life Dr. Bird was but little known. He was a keen and zealous Freemason, Founder and Pastmaster of the Sancta Maria Lodge, also a member of the London Rank and other lodges. His annual holiday was spent tramping alone; his evenings with books.

From the personal tributes to Dr. Bird which we have received, we select two dealing with different periods of his life.

Prof. F. S. Langmead writes: By the death at Margate on August 27th of Dr. Mitchell Bird, St. Mary's Hospital and its school have lost one of its most ardent supporters, and many past students and residents will mourn a friend. For a period of 30 years he filled the post of medical superintendent at that institution with devotion, for all that concerned it and its alumni lay very near his heart; yet with so much humility that none can tell and few can guess the measure of his service. He delighted to hide his light under a bushel, yet those who have been residents at St. Mary's know how bright was that light and how time and again it revealed the true solution of a medical case which had hitherto baffled any who had seen it. He appeared to combine in an unusual way two virtues which would seem to be well-nigh incompatible—a simple guilelessness and astute diplomacy. In himself and his personal relationship to the world he had the heart of a child, but to nurses, residents, students, and patients he was ever a wise counsellor. With a self-denial which amounted almost to asceticism he had always a helping hand for those who needed it, whether saints or sinners, for he loved his fellow men. He was so much a part of St. Mary's that his resignation some two years ago to take up a similar post at the Royal Sea Bathing Hospital at Margate snapped perhaps the strongest personal link in the chain which bound all those who for 30 years or so had been closely associated with the hospital, whether as sisters, nurses, residents, or students.

Dr. Charles J. Heaton writes: Dr. Bird came to us at the Royal Sea Bathing Hospital nearly two years ago, full of mature wisdom after his long administration at St. Mary's Hospital, as resident medical officer. The R.M.O., who is looked up to by generations of students and friends as the father of the hospital, needs a peculiarly tactful and kindly character as well as clinical ability and experience of a high order. These gifts Dr. Bird possessed to the full. It is with gratitude we remember his work with us. He was always ready to help and advise, and his tactful understanding and clinical experience were sincerely appreciated. His colleagues on the staff were glad to have known him and to have had him with us. It is a sincere sorrow to us to lose him so suddenly, and we desire to place on record our appreciation of him as a friend and colleague.

In attempting to sum up Dr. Mitchell Bird's life as a whole, it can hardly be doubted that one who played a large part in the education of several hundreds of medical men now on the Register and of some privileged women has had more influence on the profession than many of those whose names are widely famed. He taught, mainly by example, discretion, patience, and above all loyalty, and there must have been few among those who did not hesitate to shed their burdens on his broad shoulders who would not now be ashamed to refuse responsibility for the mistakes of their juniors.

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## The Services.

### ROYAL NAVAL MEDICAL SERVICE.

THE following appointments are announced:—Surg. Cmdrs.: W. K. D. Breton to *Excellent*, temp.; W. R. Harrison to *Pembroke*, for R.N. Hospl., Chatham, temp.; B. R. Bickford to *President*, addl., for R.N. College, Greenwich, temp.; and A. R. Davidson to *Fishgard*. Surg. Lt.-Cmdrs.: F. E. Fitzmaurice to *Victory*, addl., for R.M.A., Eastney, temp.; J. L. Priston, H. W. Fitzroy-Williams, H. B. Parker, R. A. W. Ford, A. C. Shaw, R. K. Shaw, R. A. Brown, J. Kirker, L. R. Warburton, O. D. Brownfield, and P. W. Carruthers to *President*, addl., for five months' course of instruction. Surg. Lts.: J. S. McGrath to *Victory*, addl., for R.N. Hospl., Haslar; J. H. B. Crosbie to *Ramillies*; A. E. Phillips to *Fitzroy*; and J. F. Pace to *Impregnable*.

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*Royal Hospital, Chelsea:* Maj. E. T. Potts, R.A.M.C., to be Physician and Surgeon, vice Maj. R. J. C. Thompson.

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### ROYAL ARMY MEDICAL CORPS.

Lt.-Col. W. J. P. Adye-Curran retires on ret. pay on account of ill-health contracted on active service.

Maj. A. W. Howlett is placed temp. on the half-pay list on account of ill-health.

Maj. J. T. Simson is restd. to the estabt.

Capt. P. A. With retires, receiving a gratuity.

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### ROYAL AIR FORCE.

D. J. Jones is granted a temporary commission as a Flight Lt.

Flight Lt. J. C. Smyth is transferred to the Reserve, Class D 2.

# Correspondence.

"Audi alteram partem."

## CANCER AND THE PUBLIC.

*To the Editor of* THE LANCET.

SIR,—The Registrar-General's returns for 1920 for England and Wales, published this year, are remarkable for at least two facts. The most satisfactory is the general low rate of mortality, even below 13 per 1000. The least satisfactory is the high death-rate from cancer. No less than 43,687 such deaths have been recorded in a population of less than 40 million. This means a higher rate than 1 per 1000. Now the credit of the medical profession is bound up with the mortality of the nation, both the general mortality and the specific mortality from any one cause. In these returns we have at the same moment cause for congratulation and for shame.

We are not responsible for the creation of diseases, but we accept the responsibility of curing them, and the best way to do this is to control their attacks. Preventive medicine is one of the outcomes of therapeutic failure. Preventive surgery must be resorted to where the good results of operation are so meagre. If a river has to be dammed it is easier at its source than near the mouth. The whole question, Sir, is this, Are we of the medical profession doing our duty towards relieving humanity of this advancing scourge? What precisely are we doing? A vast amount of research is going on, and the chief result is the production of carcinoma by the application of tar to the skin, and of sarcoma by injections of tar in experimental animals. This bears upon the causation, and the discovery of this should be of great value towards cure. As to treatment we operate, we radiate, we fulgurate, and a small proportion of the patients have neither further symptoms nor recurrence. Unless they die of other diseases we still hesitate to call them cured.

What do we do to prevent cancer? Surgically I believe we do a great deal, and the removal of a breast for degenerative mastitis I regard as an example of preventive surgery applied to carcinoma. Nevertheless, in the majority of our cancer patients we are fighting a losing battle, and whatever we may tell the patient we know from the outset how gloomy the prospects are. I used to think that ignorance of the dangers of malignant disease was more characteristic of the patients who occupy our hospital beds, but I find that in private practice the patients are almost as ignorant, and the position of the surgeon accepting fees for wellnigh hopeless operations is worse than when he is working as a servant of a voluntary hospital. We commonly comfort ourselves by thinking that we do our best, and we do, as a matter of fact, cure some of the patients and relieve the vast majority, but is this our best? Who is responsible for the persistence of ignorance: the unlearned, or those who hide the knowledge they possess?

The members of the medical profession are precluded from advertisement. Any doctor who communicates his professional knowledge to the lay press lays himself open to such a charge. This is doubtless a wise provision, but does it not sometimes react to the disadvantage of the public? Most of our large daily papers now possess a medical correspondent, and these authorities are letting in a little daylight on the working of our profession. Sometimes it is judicious, and I think in the matter of cancer education some help is being given. But it is meagre in amount and done in an apologetic way. If we contrast with this what is being done in the case of venereal disease the picture is totally different. We have, at the present time, the luxury of at least two societies each striving according to their lights to protect the public against the social evils of syphilis and gonorrhœa. The ravages of tuberculosis, also, have called into being a society for its suppression, but what is being done in the case of the most terrible scourge of the present day? Historically the cause of these diseases was established before the societies were founded, but is there any need to wait until our knowledge is more complete, since almost everyone admits that there is a curable stage of cancer? It is a monster which can be slain only in its infancy.

In this country a book was published some ten years ago by Mr. C. P. Childe entitled "The Control of a Scourge: How Cancer is Curable," and it is an excellent book, calculated to do nothing but good. But who has read it? More recently "Cancer, a Handbook for the Lay Public," has been issued with the idea of securing financial support for the Cancer Research Fund of Ireland, but it received little encouragement even from your own journal (vide THE LANCET, Feb. 4th, 1922, p. 236). The medical officer of health for Leicester has issued a pamphlet to be distributed by health visitors from the Town Hall. These and similar efforts have been made, and, as I see it, well made, but they are not concerted efforts and they do not reach a large enough public. The lay press is certainly helping, and such papers as insure their readers against pecuniary loss by reason of appendicitis and similar ills might well, and at less cost to themselves and more gain to their clients, instruct widely in the early signs of malignant disease. The medical man's fear is that, as a result of this species of anti-cancer propaganda, cancerphobia, already a recognised human ailment, would become rife. Personally, I would rather spend my time reassuring patients who have not got cancer than operating on those who have. Further, I do not think the danger a very real one provided the public education is properly conducted.

In America they do these things differently. There they have a powerful Society for the Control of Cancer, and much work is being done by it to enlighten the public as to its early signs and the dangers of delay. The power of the press and the pulpit are both being utilised in this good cause, and I believe I am right in saying that this society organises "Cancer Weeks" from time to time. Now this sounds horrible, but I believe with our present lack of precise knowledge it is the most satisfactory road to success in treatment.

Finally, I have gleaned from THE LANCET that the League of Red Cross Societies, which has its headquarters in Geneva, is doing something in the matter. Also, through the courtesy of Sir Arthur Stanley, I know that the British Red Cross is anxious to help, but the question I should like to raise is whether it is not time that some specific body should be formed in this country to combat its worst pathological enemy. Noble benefactors, or potential benefactors, have placed large sums on offer for a medical cure for cancer, and I sincerely trust the money will shortly be earned. Pending this, will not others contribute towards the cost of educating the public, so that the sick person shall no longer attribute to the hand of God what is probably due to the carelessness of man?

I am, Sir, yours faithfully,

JOSEPH E. ADAMS.

Harley-street, W., Sept. 4th, 1922.

## SURGICAL EMERGENCIES AT SEA.

*To the Editor of* THE LANCET.

SIR,—Surgeon-Commander H. E. R. Stephens's article in your issue of July 29th (p. 229) on the removal of a perforated appendix at sea, impels me to suggest the provision of a suitable syringe and a supply of stovain ampoules to every ship which only carries a single surgeon, and that the necessary technique of spinal analgesia should be taught in every hospital at home and abroad. If Commander Stephens had been in possession of this means of inducing analgesia, he could easily have removed the stoker's appendix with the assistance of his sick bay

steward alone. By pushing morphia and hyoscine to the extent of half or even three-quarters of a grain of the former, it is possible to remove even a difficult appendix under local analgesia, assisted perhaps in some cases by a few whiffs of chloroform while the appendix is being delivered.

One cannot help deploring the fact that in this country, where so many doctors have to practise singlehanded, no attempts are made in the majority of the teaching hospitals to use local analgesia and to impress its great advantages on the students.

I am, Sir, yours faithfully,

J. W. PORTER,
Major, R.A.M.C. (retired).

Bombay, August 22nd, 1922.

## DEATH IN THE ALPS.

*To the Editor of* THE LANCET.

SIR,—Reports continually appear of persons who are killed by falling in the Alps. Some of these cases occur through storms, avalanches, or other unfavourable events, but quite a large number cannot be attributed to any activity on the part of the mountains. They seem explainable only as in some way due to the acts of the persons themselves. Must we go as far as Stekel in saying that only a small part of the accidents in the mountains are actually accidents, and that they are for the most part really cases of involuntary suicide? Perhaps the following observations may suggest an answer.

The Geneva psychologist Flournoy reports the case of a man who consulted him because he lived in constant fear of dying from a fall in the mountains. This fear was persistent and overpowering, in spite of the fact that he knew he could avoid such a fate by not undertaking any dangerous climbs. For several years he made no mountain excursions at all. At last he undertook one with a feeling of perfect security. During a rest at a place where there was really no danger he went to sleep and fell into eternity. Why should he fall asleep in such a place, and why should he in his sleep make a movement that threw him into the abyss? Stekel tells of a passionate mountain climber who was in trouble. On one occasion, on the Rax, he was seized with the impulse to put an end to all his troubles by a fall. The impulse was not carried out, but shortly afterward at a dangerous point he became unable to proceed and was seized with violent giddiness. He afterwards described the condition as one of a struggle between two impulses, one to throw himself down and the other not to do so.

Many people undergo experiences like the one lately related to me by a patient. While climbing in the mountains around Badgastein he had to pass along a narrow path on a long steep slope. The path was perfectly safe, but he was seized by such an uncontrollable fear of falling that he could not proceed. Later, on coming to a ridge where the other side descended to great depths, he was obliged to throw himself on the ground, not on account of a fear of falling—of which there was no possibility as long as he remained where he was—but because he knew that if he made a step further he would throw himself over the ridge. This same impulse had all his life long made it impossible for him to approach the edge of any building or to cross a bridge without a rail to hold on to. It was quite frankly an overpowering impulse to commit suicide that lay in his unconscious mind and came to the surface only when there was a chance to fall. The fear in such a case is not a fear of falling, but a fear of yielding to the suicidal impulse. Such unconscious impulses often execute themselves during sleep. I have no doubt that the man of Flournoy's account fell asleep in that particular place because his unconscious mind wished to get the opportunity of carrying out its plan while consciousness was dormant. I further venture to assert that for many persons who are troubled by giddiness and fear in the mountains the cause is exactly the same—namely, an unconscious wish to commit suicide.

Mountain climbing has often been deliberately and consciously used as a means of committing suicide respectably. The above considerations seem to indicate that it may be used unconsciously and involuntarily for the same purpose.

I am, Sir, yours faithfully,

E. W. SCRIPTURE.

New Cavendish-street, W., Sept. 6th, 1922.

## PUERPERAL SEPTICÆMIA AND SCARLET FEVER.

*To the Editor of* THE LANCET.

SIR,—On July 7th I was called by a midwife to a puerperal woman with fever. A swab taken from the interior of the uterus was sent to Dr. E. Cronin Lowe, who reported a pure culture of *Streptococcus puerperalis*. On July 8th one of the patient's children developed scarlet fever, and was removed to the isolation hospital. On July 9th another child developed scarlet fever; in this case a swab from the throat showed *Streptococcus brevis*. On July 10th a third child developed scarlet fever. The throat was swabbed and a few streptococci found in the films, but these could not be isolated. The mother, who recovered, was treated on the first day with 500 millions detoxicated streptococci. The uterus was douched once with liq. sodæ chlorinatæ 1 in 3. 750 millions detoxicated streptococci were given on the second and 1000 millions on the fourth day. I am, Sir, yours faithfully,

J. HARGREAVES ROBINSON.

Southport, August 29th, 1922.

## THE SCOPE OF VACCINE THERAPY.

*To the Editor of* THE LANCET.

SIR,—In your issue of Sept. 9th Dr. C. E. Jenkins in his paper on this subject makes two statemnts which should not in my view be allowed to pass without protest.

(*a*) He says: The number of injections (apparently of any vaccine) should not exceed eight. In the practice of the laboratory which I direct, we have found that in respiratory diseases (including prophylaxis) and the various ailments arising from intestinal stasis we have obtained much better results by diminishing the dose and increasing the number of injections; in the vast majority of our cases the prescribed course consists of 16 doses, and we find that the improvement in the patient's condition is usually greater during the second half of the treatment than the first.

(*b*) The old type of vaccine is not, in Dr. Jenkins's opinion, preferable or even equal to the residual vaccine in the improvement it produces. Here it is, perhaps, doubtful whether he uses the word "residual" as synonymous with "detoxicated," as he evidently does in the sentence immediately preceding it. If so, I can only say that in gonococcal and catarrhal vaccines quite half of the cases which I see in consulting and laboratory practice are sent by their medical attendants for an autogenous vaccine, because they have derived little or no benefit from the "detoxicated" variety.

Both the points on which Dr. Jenkins is dogmatic are, in my opinion, open to discussion, and it is better for the pathologist to treat each case on its merits.

I am, Sir, yours faithfully,

A. KNYVETT GORDON, M.B.

Bedford-square, W.C., Sept. 12th, 1922.


**THE LANCET: SUBSCRIPTION RATES.**

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Subscriptions may commence at any time and are payable in advance. Cheques and P.O.'s (crossed "London County Westminster and Parr's Bank, Covent Garden Branch") should be made payable to THE MANAGER, THE LANCET Offices, 423, Strand, London, W.C. 2.

# Medical News.

ADDENBROOKE'S HOSPITAL, CAMBRIDGE.—A post-graduate course will be held from Monday, Sept. 25th, to Saturday the 30th inclusive. There will be no fees for the course. Further particulars will be supplied on application by the secretary to the staff.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL: *Opening Ceremony and Annual Dinner.*—The opening ceremony of the winter session will be held at 2.45 P.M. on Tuesday, October 3rd, when the introductory address will be delivered by Sir Herbert Jackson, F.I.C., F.R.S. The chair will be taken by Viscount Hambleden. The annual dinner of past and present students will be held at 7 P.M. for 7.30 on the same day at the Café Royal, Regent-street, London, W., with Dr. Percy Lewis in the chair.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The further series of post-graduate lectures for next session will begin on Wednesday, Oct. 11th, when the opening lecture will be given by Sir James Galloway on the Symptoms and Treatment of Certain Unexplained Granulomatous Diseases. Dr. Eric Pritchard and Dr. C. E. Lakin will also lecture during October; the complete programme up to Dec. 13th will be published shortly. As already announced, a special course in tropical diseases will be given at the London School of Tropical Medicine from Oct. 2nd, and will consist of 12 meetings distributed over four weeks on Mondays, Wednesdays, and Fridays from 2 to 4 P.M. The syllabus will be available shortly. Those desiring to take the course should as soon as possible inform the secretary, Fellowship of Medicine, 1, Wimpole-street, London, W. 1.

Dr. T. Eustace Hill has been elected President of the Society of Medical Officers of Health for the coming year.

INDUSTRIAL WELFARE SOCIETY.—The third annual lecture conference for welfare supervisors organised by the Industrial Welfare Society is being held at Balliol College, Oxford, from Sept. 15th to 20th. This year the conference is open to both men and women, special arrangements having been made for the women delegates at Lady Margaret Hall. The session will be opened on Friday evening by Mr. J. W. Pratt, M.P., Parliamentary Under-Secretary for Scotland. Included in the programme are such subjects as Welfare under the Whitley Principle; the Employment Department: its Functions and Personnel; Health, First Aid, Safety. On Sunday, the 17th, Mr. Frank Hodges, secretary of the Miners' Federation of Great Britain, will give an address on Health and Welfare in the Mining Industry. Dr. H. M. Vernon, of the Industrial Fatigue Research Board, will speak on Record Keeping and Statistics. Other lectures will be on Canteens, by Mr. Arthur F. Agar, and Superannuation and Pension Schemes, by Mr. J. H. Robertson. There will also be a series of short practical papers by supervisors, sectional meetings, and a special session for women.

ROYAL SUSSEX COUNTY HOSPITAL.—As a result of the grave financial position, the governors of the Royal Sussex County Hospital at Brighton decided on Sept. 7th to reduce the number of beds and curtail the other activities of the institution, which is the largest of its kind in the county of Sussex. After numerous amendments and addenda the decision was unanimously arrived at in the following terms:—

That the board of management be directed to close as from Oct. 1st next four wards in the hospital for the time being, and to curtail the other activities of the hospital in such manner as they may deem necessary in view of the present financial crisis; and further that they shall be empowered to engage such and only such a paid staff as in their opinion may be considered necessary to run the hospital on the reduced basis. Nevertheless, it shall be competent for the board of management, should opportunity arise, anything in the resolution notwithstanding, to reopen any beds so closed provided that the means to support them are in view.

In the course of the discussion deep regret was expressed that such a drastic step had to be taken. The income of the hospital has always been a source of great anxiety. Special appeals had been in vain, or, rather, the responses had been totally inadequate. Last year an appeal for 250,000 half-crowns brought in only 96,000. The year ended with a deficit of £12,615. A further appeal this year brought in only £150, four of the six contributors to this sum being members of the hospital staff. The Sussex Provident Scheme has not been widely supported, and the unanimous decision of the governors to close down some 125 beds out of the total of 225 is not surprising.

PRESENTATION TO A MEDICAL MAN.—Dr. James Richard Lownds, of Dedham, Essex, was presented on Sept. 1st, at the Loyal "Reliance" Lodge of the Independent Order of Oddfellows, with a marble eight-day timepiece as a mark of appreciation of his services during the last 20 years.

CUMBERLAND INFIRMARY.—At a quarterly meeting of the governors held on August 30th a proposal to establish 14 new beds was rejected for financial reasons, but it was pointed out that the debit balance at the end of June was £10,837, or £1513 less than a year ago. The Augmentation of Income Committee reported that new annual subscriptions during the quarter amounted to £16 16*s.*, and increased subscriptions to £13 3*s.* Donations during the quarter amounted to £791 19*s.* 6*d.*, as against £1116 1*s.* 10*d.* in the corresponding quarter of last year. Mr. H. A. Lediard, surgeon to the infirmary, said that the institution could not be placed on a firm financial basis unless there was a change in the method of collecting subscriptions; he referred to the system which had proved successful at Oxford. A twopenny levy would place the infirmary in a position to meet the requirements of the district and do away with the usual waiting list of patients.

HAMPSHIRE HOME OF RECOVERY.—Stoneham Park House, Eastleigh, was dedicated by the Bishop of Southampton on Sept. 7th as a Home for Surgical Semi-Convalescents, a stepping-stone between hospital and health. Its object is two-fold—to relieve the strain on the general hospitals of Hampshire by the provision of suitable conditions for the earlier discharge of patients from surgical wards, and to provide such patients with proper treatment among surroundings conducive to speedy recovery. The house is modern (1913), standing on gravel soil, with 22 acres of surrounding grounds. At present only men are received, but it is hoped in time to add women's wards. The only source of endowment at the present time is the income from investments held by the Charity Commissioners, which produce about £380 yearly. The Committee of Associated Hospitals in Hampshire have intimated that they will make a payment for each of their hospital patients sent to the home, and patients themselves will probably wish to make some contribution. The income from these sources may provide about one-third (£1150) of the sum required to do the work efficiently; it is therefore estimated that, in order to supply the minimum need of Hampshire for 25 surgical convalescent beds, it will be necessary to raise the remaining two-thirds (£1900 a year) by other methods.

MEDICAL WOMEN'S INTERNATIONAL ASSOCIATION.—The second meeting of this Association was held at Geneva from Sept. 4th to 7th. The Association had its origin at a meeting in New York in 1919 of medical women from 15 nations. The meeting, which was called to discuss international problems and subjects connected with health, ended by drawing up a provisional constitution which was to be amended or reconstructed at some subsequent session to be held overseas. The recent meeting was organised by the joint efforts of the officers of the International Association, of which Dr. Christine Murrell was the British representative, and there were present medical women from 19 different countries. Many of these representatives were sent by various accredited organisations. About 80 members in all were present, of whom five came from Great Britain and five from U.S.A. The chief business before the meeting was the reconstruction of the constitution. The committee appointed for this purpose was presided over by Dr. Jane Walker, and accepted a revised constitution by a unanimous vote. Later this was passed by the general meeting, and is to be ratified at the Medical Women's International Association Conference to be held in London next year. Problems which could only be solved on international lines were discussed, including the treatment and prevention of venereal disease in its relation to the State, the white slave traffic, and cocaine and other drug traffic. In relation to this latter subject, a strong resolution was passed requesting the League of Nations to insist on Government control both as to the manufacture and the sale of cocaine. The meeting was important both on its administrative and scientific side, but its greatest value was acknowledged to be the better understanding among the representatives of the various countries. Various social functions were interspersed with the more serious business of the meeting. The British and French contingents entertained all the delegates, and a banquet was held, presided over by Dr. Esther Lovejoy (U.S.A.), at which the 19 official representatives in turn made short speeches, the British speaker being Dr. Mary Scharlieb. The President of the Federation of Medical Women in Great Britain, Lady Barrett, and the President of the National Association of Women Physicians of the United States of America, Dr. Grace Kimball, as well as their veteran senior physician, Dr. Mosher, also spoke.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—The Harveian Oration will be delivered by Dr. Arnold Chaplin on Wednesday, Oct. 18th, at 4 P.M. Sir Maurice Craig delivers the Bradshaw Lecture on Nov. 2nd, his subject being "Mental Symptoms in Physical Disease." The Fitz-Patrick Lecture will be given by Dr. R. O. Moon on Nov. 7th and 9th, with the title "Philosophy and the Post-Hippocratic School of Medicine."

SMALL-POX IN DERBYSHIRE.—Two cases of small-pox have been reported at Bolsover, Derbyshire.

MEASLES EPIDEMICS IN THE NORTH.—The Manchester medical officer's report for the week ending Sept. 2nd shows no decided decrease in the number of fresh cases; 400 were reported as against 440 during the previous week. The corresponding figure for last year was 31.—In Aberdeen the reported cases are diminishing, and the outbreak has not reached epidemic proportions.

DONATIONS AND BEQUESTS.—Among other bequests the late Miss Ann Clayton, of Sheffield, left £250 each to the Royal Hospital, West-street, Sheffield, and to the Jessop Hospital for Women.—The Salford Royal Hospital has received £587, the proceeds of a musical festival held at the Manchester Race Course in June last.—The late Mr. Edward Hatton Cookson, a large shipowner and a former mayor of Liverpool, bequeathed the following legacies: £1000 each to the Royal Southern Hospital, the Bluecoat Hospital, Liverpool, the Seamen's Orphanage, and Home for Aged Mariners, Egremont; £500 each to the Royal Infirmary, the David Lewis Northern Hospital, Liverpool, and the East Liverpool Day Nursery; £200 each to the Infirmary for Children, the Dental Hospital, Liverpool, and the Bankhall Girls' Institute, Kirkdale.—Dr. Abraham Matthewson Edge, of Southport, whose death was recorded in THE LANCET of Sept. 2nd, left £21,793; he bequeathed the bulk of his estate to his wife for life, and on her death he leaves £500 to the Salford Royal Hospital, and £100 each to the Royal Medical Benevolent Fund, the Manchester and Salford Church Rescue and Preventive Society, and the St. Mary's Home, Rusholme.—At the recent opening of an electro-massage department at Preston Royal Infirmary, equipped from a gift of £5000 made by Lord Ashton, the Guild Mayor announced two donations of £1000 each and a third of £500 to the infirmary from three local cotton manufacturers.

FIFTY YEARS OF CHEMICAL WORK.—The June number of the *Journal* of the American Pharmaceutical Association contained a biographical sketch of Mr. Frederick Belding Power, Ph.D., LL.D., F.C.S., director for 18 years of the Wellcome Research Laboratories in London, who has lately completed half a century of scientific work. Born in 1853, Dr. Power entered a pharmacy in his native town of Hudson, N.Y., at the age of 13 years. In 1870 he took a post at Chicago, with the intention of attending a school of pharmacy, but the great fire of 1871 intervened, and in the following year he went to Philadelphia, entered the pharmacy of Prof. Edward Parrish, and became a member of the American Pharmaceutical Association. In 1874 he graduated with high honours in chemistry at the Philadelphia College of Pharmacy. From 1876 till 1880 he studied at the University of Strasbourg, and received the degree of Doctor of Philosophy. Returning to America, he was given the charge of the chemical laboratory of his old college at Philadelphia, and later accepted the chair of pharmacy and materia medica at the University of Wisconsin. In 1892 he became scientific director of the firm of Fritzschi Brothers, near New York, and conducted important investigations relating to essential oils. In 1896 his friend, Mr. Henry S. Wellcome, appointed Dr. Power director of the newly established chemical research laboratories in London, where he gained his wide reputation for research, especially in the direction of plant chemistry. Dr. Power left England in 1914, in order to be near his family in his native country. He is now in charge of phyto-chemical investigations in the Bureau of Chemistry of the United States Department of Agriculture at Washington.

# Appointments.

COLE, T. PHILIPS, M.B., B.S. Lond., D.P.H. Lond., has been appointed Medical Officer of Health for Bognor.

LAMPLOUGH, W. H., M.D., B.S. Durh., D.P.H., Medical Officer of Health to Gosport Urban District Council.

MACPHAIL, W. M., M.B., Ch.B. Edin., Assistant Medical Officer to the Leeds Township Infirmary.

MCKENZIE, T. C., M.B., Ch.B. Birm., Certifying Surgeon under the Factory and Workshop Acts for Smethwick.

The Infants Hospital, Vincent-square, Westminster: PATERSON, D., M.B., Ch.B. Edin., MACKAY, HELEN, M.D., B.S. Lond., Assistant Physicians; MOORE, ENID M., Anæsthetist.

# Vacancies.

*For further information refer to the advertisement columns.*

*Aberystwyth Infirmary and Cardiganshire General Hospital.*—H.S. £250.
*Barrow-in-Furness, North Lonsdale Hospital.*—H.S. £225.
*Barry Urban District Council, &c.*—S. £750.
*Belfast Royal Victoria Hospital.*—Res. Biochemist. £200.
*Birmingham, Queen's Hospital.*—Two H.S.'s. Each £70.
*Bradford Royal Infirmary.*—Two H.S.'s. £200.
*Buxton, Derbyshire, Devonshire Hospital.*—H.P. £200. Also Asst. H.P. £150.
*Canterbury, Kent and Canterbury Hospital.*—Hon. Radiologist.
*Central London Ophthalmic Hospital, Judd-street, St. Pancras, W.C.*—H.S. £100. Also Jun. H.S. £50.
*Chester Royal Infirmary.*—Asst. H.S. £150.
*City of London Hospital for Diseases of Chest, Victoria Park, E.*—H.P. £125.
*County Council of Middlesex.*—Dental Officer.
*Dreadnought Hospital, Greenwich.*—H.S. £150.
*Dumfries and Galloway Royal Infirmary.*—Sen. Res. M.O. £175.
*Eastbourne, Princess Alice Hospital.*—Res. H.S. £175.
*Edinburgh Royal Infirmary, Eye Dept.*—Sen. Clin. Asst., &c. 145 guineas.
*High Wood, Brentwood, Essex.*—Jun. Asst. M.O. £515 6*s*.
*Hull Royal Infirmary.*—Asst. H.S. £150.
*Infants Hospital, Vincent-square, Westminster.*—Asst. P.
*Islington Dispensary, 303, Upper-street, N.*—Res. M.O. £300.
*Lancaster County Asylum.*—Asst. M.O. £300.
*London Homœopathic Hospital, Great Ormond-street, W.C.*—Anæsth. £50.
*Lucknow University, India.*—Prof. of Ophthal. Rs.1200 a month.
*Manchester, St. Mary's Hospitals for Women and Children.*—H.S. £100.
*Manchester, Salford Royal Hospital.*—R.S.O. £250. H.P. £200. Two H.S.'s and Cas. H.S. Each £150.
*Montrose Royal Asylum.*—Asst. Med. Officer. £300.
*Newport, Mon., Royal Gwent Hospital.*—H.S. £180.
*Oswestry, Shropshire, Orthopædic Hospital.*—H.S. £250.
*Oxford, Radcliffe Infirmary and County Hospital.*—Anæsth. £100, and Hon. Asst. P.
*Poplar Hospital for Accidents, Poplar, E.*—Asst. H.S. £150.
*Prince of Wales's General Hospital, Tottenham, N.*—H.P. and H.S. Each £200. Jun. H.S. and Jun. H.P. Each £120.
*Queen Mary's Hospital for the East End, Stratford, E.*—Res. M.O. £300. Cas. O. £150.
*Richmond Royal Hospital, Surrey.*—H.S. £150.
*Royal National Orthopædic Hospital, 234, Great Portland-street.*—Two Hon. Radiologists.
*Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.*—H.S. £100.
*Ryde, Royal Isle of Wight County Hospital.*—Res. H.S. £200.
*St. Bartholomew's Hospital Medical College.*—Dem. of Mid.
*St. George's Hospital, S.W.*—Radiologist. £100.
*Sheffield Royal Hospital.*—Asst. Cas. O. £150.
*Sheffield University.*—Dem. in Path. and Bact.
*Swansea County Borough.*—Asst. M.O. £500.
*West End Hospital for Nervous Diseases, Welbeck-street, W.*—Hon. M.O. for Elect. Dep.
*Westminster Hospital, Broad Sanctuary, S.W.*—Asst. H.P. and Asst. H.S. Each £52.
*Whipps Cross Hospital, Whipps Cross-road, Leytonstone, E.*—Deputy Med. Sup. £600.

# Births, Marriages, and Deaths.

## BIRTHS.

BRADFORD.—On Sept. 4th, at Laneside, Horsham, Sussex, the wife of E. Cordley Bradford, M.B., of a son.
CRAMPTON.—On Sept. 4th, at Frognal, N.W. 3, the wife of H. Crampton, M.D., of a son.
HARDWICK.—On Sept. 5th, the wife of R. H. Hardwick, M.R.C.S., L.R.C.P., of Headcorn, Kent, of a son.
STRACHN.—On Sept. 6th, at Lower Seymour-street, W. 1, the wife of Captain E. A. Strachn, R.A.M.C., of a son.

## MARRIAGES.

HUNTER—WHITFIELD.—On Sept. 6th, at the Parish Church, Beaconsfield, John Bowman Hunter, to Hilda Margaret, elder daughter of Dr. and Mrs. Arthur Whitfield, of Redlands, Beaconsfield.
MARTIN—WILLIAMSON.—On Sept. 5th, at Northumberland-square Presbyterian Church, Norman A. Martin, M.B., B.S., to Ruth, daughter of the late J. B. Williamson and Mrs. Williamson, Camp End, North Shields.

## DEATHS.

BETHELL.—On Sept. 7th, at Claremont, Fleet, Hants, Alfred Bethell, M.R.C.S., L.S.A., late of Bridgnorth, aged 71.
HALE.—On Sept. 5th, at The Bryn, Wimbledon, Charles Douglas Bowdich Hale, M.D., aged 72.
WINNETT.—On Sept. 7th, Julius Maurice Winnett, B.A., M.R.C.S., L.R.C.P., aged 28.

***N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.***

# Notes, Short Comments, and Answers to Correspondents.

## PUBLIC HEALTH IN INDIA.

### ANNUAL REPORT* OF THE PUBLIC HEALTH COMMISSIONER FOR 1920.

THE Indian Empire extends over a territory larger than the continent of Europe without Russia, whose population is about three-fourths of that of the whole British Empire. The report before us is colossal but small in proportion to the problems with which it deals. It naturally falls as usual into three parts. The first and second which relate to the British and Indian Armies are contributed by the Director of Medical Services in India, and the remainder by Lieut.-Colonel A. B. Fry, I.M.S., officiating Public Health Commissioner with the Government of India. The reports and tables extend to 313 pages, are well printed, and illustrated by numerous diagrams. The absence of a map, showing the present administrative divisions of the country, such as was formerly supplied, makes the report less easy to follow by the general reader and is to be regretted.

#### I. HEALTH OF EUROPEAN TROOPS.

The health of European troops in India was adversely affected by the fact that "the garrison was composed almost entirely of young and inexperienced troops fresh from England. Neither they nor, in many cases, their officers had previous experience of the conditions of living peculiar to a tropical country, nor had they knowledge of the dangers to health entailed" thereby. It appears also that "medical inspection of the men prior to embarkation for India had not been carried out with thoroughness and due regard to the fact that they were about to go to a tropical country." The admissions to hospital and the average number constantly sick amounted to 1071·5 and 60·84 per 1000 respectively, these ratios being higher than in 1918 (1030·2 and 60·0, the highest during the war period), and about double those of the pre-war quinquennium, 1910–14 (567·2 and 30·13). The death-rate, 6·72, was less than in 1918 and 1919 (16·19 and 7·74 respectively), but considerably in excess of the pre-war quinquennial average, 4·36.

*Cholera, Small-pox, Enteric Fevers.*

Beginning with major infections, there were only two admissions for cholera (with no death); both cases occurred at Allahabad. Small-pox caused 24 admissions to hospital and 4 deaths (0·4 and 0·07 per 1000, compared with 3·1 and 0·34 in 1919). For the "enteric group of fevers" there were 262 admissions (4·6 per 1000) and 26 deaths (0·45 per 1000). This expression, "enteric group," is (as in the report for 1919) used to signify cases not definitely diagnosed as typhoid, paratyphoid A, or paratyphoid B, as well as for the whole "group," including those three components. We have good authority for believing that "the whole is greater than its part," and there can be no possible justification for the use of this term *both* for the total admissions (262) and deaths (26), *and* for the admissions (173) and deaths (17) due to fevers not definitely diagnosed as typhoid, paratyphoid A, or paratyphoid B. The expression "enterica" (for the *whole* group) would appear to be suitable, as applied in the report for 1918 (p. 11): "To arrive at a more correct appreciation of the numbers of cases of enterica occurring in India, the *sub*-heading of 'enteric group' was introduced. Under this heading are now included cases which formerly had to be relegated to the 'pyrexia of uncertain origin' class—that is, cases from which the specific organism could not be recovered [but which] may be diagnosed on clinical grounds, or on a rising Widal reaction." Of the total 262 cases and 26 deaths only 46 and 7 were definitely diagnosed as enteric fever; flies were considered to be the carriers of infection at Quetta and Pindi; at Nasirabad a cook, and at Hyderabad (Sind) a dairy worker, were found to be carriers. Of the 57,332 troops present at a census taken on Dec. 31st, 1920, only 723 were found not to be inoculated.

*Malaria.*

There was an appreciable decrease in malaria prevalence, the admission and death ratios being 176·6 and 0·42 per 1000, compared with 217·8 and 0·74 in 1919; and 219·5 and 0·53 for the quinquennium, 1915–19. Putting on one side the very high incidence of 703·2 admissions per 1000 in the frontier brigades, due, no doubt, to the unavoidable conditions of active service, the divisions that suffered most were Poona (252·9 admissions per 1000), Pindi (217·7), and Mhow (203·4), these ratios being higher than those of the preceding quinquennium in Poona (210·8) and Mhow (161·0), but showing a considerable improvement in Pindi, where the ratio had been 290·9 for the quinquennium, and 362·8 in 1919. The admission ratio at Colaba (including Bombay) was 605 per 1000. The report states that "the year was a bad one on account of the failure of the monsoon, which allowed mosquitoes to breed in puddles between the showers. The unit showing the highest incidence was located in the Old Barracks, which are obsolete, and situated in a very malarious quarter of the town." The troops were moved, a conference of naval, military and civil authorities held, and arrangements made for single control of anti-mosquito work in the future. At Delhi the fever admissions were 445·8 per 1000; this is an improvement on the previous year's ratio of 511·6, and it is stated that "the garrison of the Fort was changed every month and all possible prophylactic measures enforced." In the report for 1919 it had been stated that there were "no breeding places in the Fort itself, but it harbours innumerable mosquitoes"; the same conditions appear to have obtained in 1920. It might be supposed that a vigorous anti-mosquito campaign carried out for some days in succession in the quarters, under competent supervision, would exterminate the pest, greatly increase the comfort, and diminish the fever prevalence among the occupants of these barracks. At Rawal Pindi the fever admissions were 336·6 per 1000; there are anopheline breeding grounds in Topi Park and the River Leh; anti-malarial measures were carried out, and the high fever incidence is attributed to "the close intermingling of British and Indian personnel, which is a marked feature of this station, and partly to the arrival of a heavily infected battalion from Parachinar" (Afghanistan). The decrease in fever at Secunderabad has been most marked and satisfactory; in 1918 the admissions were 965·2 per 1000; in 1919, 275·4; and in 1920, 36·2. The actual admissions were 91, of which only 36 were fresh infections. This improvement is attributed "to the drainage scheme carried out in 1918, and an energetic anti-mosquito campaign, aided by a very dry season." At 82 hospitals 7963 cases were analysed in regard to the type of fever. Of 5412 fresh cases 57·57 per cent. were benign tertian, 14·28 per cent. malignant tertian, and 0·06 per cent. quartan, the remainder being mixed infections, or cases diagnosed clinically. Of 2551 relapses, 62·09 per cent. were benign, 17·09 malignant tertian, 0·20 quartan, and the remainder mixed, &c.

*Other Fevers.*

Sandfly fever caused 5263 admissions (91·8 per 1000); all cases (except 160) occurred in the Northern Army (161·2 per 1000). The stations most affected were Peshawar, with 1509 cases (717·5 per 1000), and Landi Kotal, with 1156 cases (1632·8 per 1000). Dengue caused 493 admissions (9·7 per 1000), with no deaths; nearly all of these cases occurred at the three stations of Rangoon (251), Madras (114), and Calcutta (105). There were only 43 admissions for scarlet fever (0·8 per 1000), and of these 24 occurred at Quetta (in August), none fatal; there was only one death throughout the country from this cause, at Kirkee. Diphtheria showed an increase on the previous year, there being 101 admissions and 2 deaths, compared with 29 cases (none fatal) in 1919. At Quetta there were two outbreaks; the first commenced in December, 1919, and continued to the end of April, 1920; there were 38 cases scattered throughout the garrison. In November and December, 1920, there were 23 cases, almost entirely confined to the 4th Battalion, Rifle Brigade, in Roberts Barracks; none of the cases were serious. Measles caused 21 admissions, scattered throughout the country, none fatal. For cerebro-spinal fever there were two admissions, one at Peshawar (fatal) and one at Poona. For heat stroke there were 6·1 admissions per 1000, less than in the two years preceding (10·4 and 7·4 in 1918 and 1919 respectively), but still considerably higher than the pre-war quinquennial average (1910–14), which was 1·2 per 1000; the death ratio was high (1·31), especially when compared with that of the quinquennium, which had been 0·22. At Risalpur (Scinde) the admissions reached 53·8, and the deaths 5·72 per 1000; the atmospheric conditions were unusually severe in July and August, the maximum dry bulb thermometer readings being very high, together with a high degree of humidity. At Jullundur the admissions were 49·6, and the deaths 1·38 per 1000, all the deaths occurring in July, in the Connaught Rangers, who were under canvas. For pulmonary tuberculosis the admissions and deaths were 1·4 and 0·16 per 1000, a slight improvement on the quinquennial averages of 1·60 and 0·17. For pneumonia, on the other hand, both admissions (4·4) and deaths (0·70) were in excess of the quinquennial averages (3·3 and 0·56) in 1915–19, and still more as compared with those of the pre-war quinquennium (2·4 and 0·26); at Quetta the ratios were 6·3 and 0·94. For the group of diarrhœal diseases (dysentery, colitis, and diarrhœa) there were 48·9 admissions and 0·18 deaths per 1000, as compared with 49·7 and 0·35 in 1915–19; and 33·3 and 0·22 in 1910–14. Secunderabad had the high admission rate of 51·3, but not a single death, from this cause. The various types of dysentery were recorded in 564 cases at 56 stations; of these 470 were diagnosed as of

* Superintendent of Government Printing, Calcutta. April, 1922.

protozoal origin (83·32 per cent.), and 14 as bacillary. At Secunderabad all the cases (129) were amœbic; at Bangalore, 56 out of 59; and at Wellington, 42 out of 44.

*Venereal Disease.*

There is still, unfortunately, a very high prevalence of venereal disease; in the pre-war quinquennium (1910–14) the total admissions for syphilis, soft chancre, and gonorrhœa averaged 55·1 per 1000; in 1915 they fell to 29·1; since then they have risen year by year, until in 1919 the ratio was 87·6, and in 1920 118·2 per 1000—that is, more than double the incidence before the war. In Burma 261·9 per 1000 of the troops, and in Secunderabad Division 175·9 per 1000 were admitted to hospital for this cause; in Rawal Pindi Division and in Peshawar Division the ratios were 65·0 and 37·0. Taking individual large stations, Madras with 351·4 and Rangoon with 346·9 per 1000 had the highest incidence; at Sialkot the ratio was 109·0, and at Meerut only 88·5. With regard to India as a whole the question is discussed in detail. "The causes of the increase . . . are varied and complex, and many factors considered to have had an influence are extremely difficult to substantiate. The exceptionally low incidence of 29·1 and 36·8 in 1915 and 1916 was probably due to changes in the strength and composition of the garrison, which caused quite abnormal conditions, brought about by the large number of men of higher social standing and education amongst the territorial troops, and the higher percentage of married men; also more facilities were available at many stations for the entertainment and recreation of the men, arranged by extra-regimental organisations." The chief causes of the high incidence during 1920 amongst British troops are considered to have been: (1) The large number of young, untrained, and undisciplined men who arrived in India since cessation of hostilities. (2) The complete dislocation of the regimental composition in British units due to the war, whereby the number of officers with experience of the control of men during peace conditions became reduced by at least 50 per cent., and experienced N.C.O.'s and old soldiers, who in pre-war days exercised a stabilising influence on the morals and welfare of a unit became an almost negligible quantity. (3) The relaxation of morals and moral restraint which appears to have occurred during the war amongst the population of the United Kingdom, especially amongst the classes to which the present-day soldier in India belongs. (4) The closing of brothels in cantonments was coincident with the rising incidence of venereal disease, and appears to have failed to attain the objectives aimed at. (5) A number of men arrived in India who had undoubtedly contracted the disease in the United Kingdom, but in whom symptoms did not develop until after embarkation. (6) The lighting and general comfort of regimental institutes leave much to be desired, and until these are improved the young soldier is certain to seek amusements outside. The question is a difficult one to decide; and the causes suggested hardly appear to meet the case entirely. The venereal prevalence in the year reported on (118·2 per 1000) was more than double that of the preceding quinquennium (55·0) and of the pre-war quinquennium (55·1); the increase has been progressive, year by year, and with augmented force: *vires acquirit eundo*. It can be easily understood that troops in the Peshawar Division should have a low venereal incidence (37 per 1000), or those on the Frontier (32·8); but what seems to need explanation is the fact that the Burma Division has 261·9 and the division at Rawal Pindi only 65·0 admissions per 1000; or, if individual large stations are taken, Meerut has 88·5 and Madras 351·4, the latter station even exceeding Rangoon, which had a ratio of 346·9. It may be instructive to compare the relative incidence of these diseases in the Indian Army with that among European troops: the total venereal admissions in the former amounted to 70·5 per 1000 in 1920, as compared with 30·7 in 1919; 23·2 in the quinquennium, 1915–19; and 6·4 in 1910–14. The Burma Division had 164·3, the Secunderabad Division 122·2, and the Poona Division 121·4; while in the Pindi Division the ratio was only 41·9 and in the Peshawar Division only 26·2. At individual large stations Deolali had 380·3, Rangoon 178·6, Bombay 171·4, and Madras 152·8 admissions per 1000; while Bareilly had only 86·2, Meerut 85·1, and Ambala 80·9. In the Indian Army there are certainly different types of men in the various regiments composing that force, which might influence the regimental incidence of these diseases; in the British Army the type is more homogeneous. It would appear, on the whole, that the conditions leading to this important source of inefficiency need more attention on the part of the authorities, especially in regard to the very great variation in incidence in different parts of the Command. If the venereal admissions in the Pindi Division are 65·0 per 1000 for British troops and 41·9 for Indians, why are they 261·9 and 164·3 for similar bodies of men in Burma? If the garrison at Mhow has 47·7 and 44·1 admissions for British and Indians respectively, why at Bangalore are the corresponding ratios 226·1 and 131·5?

The chief causes of *invaliding* were diseases of the eye (407), of the ear (350), and of the heart (314); no ratios are stated, but the total number (2314) was considerably less than in the previous year (4324).

*Officers.*

The health of the officers serving with British units in 1920 was better than in the three years immediately preceding; the admissions to hospital were 817·6 per 1000, the invalids sent home 25·51, and the deaths 7·65; in the quinquennium, 1915–19, these ratios were 1053·0, 60·98, and 10·54 respectively; in the pre-war quinquennium (1910–14) they had been 567·5, 16·30, and 5·14. For enteric fever the officers' ratio was 7·7 (with no death); for women it was 10·4 (deaths 2·13); for children, 4·6 (deaths 0·88); and for "other ranks," 4·6 (deaths 0·45). The health of the women and children appears to have been unsatisfactory; for the former the ratios of hospital admission and death were 554·0 and 11·74 per 1000, these ratios being higher than the averages for 1915–19 (499·0 and 11·31) and for the pre-war quinquennium (504·3 and 7·09). For the children the corresponding ratios were 389·9 and 37·07, much in excess of those for 1919, which had been 321·6 and 17·45 respectively. There was no epidemic prevalence; 34 deaths occurred from enteritis, 20 from pneumonia, and 19 from diarrhœa.

II. HEALTH OF INDIAN TROOPS.

The general health of the *Indian Army* (average strength, 216,445) in 1920 was much the same as in the previous year, better than in the preceding quinquennium, but still far below the pre-war average. The hospital admissions, deaths, and average daily sick were 762·3, 9·81, and 42·8 per 1000 respectively. The corresponding ratios for 1919 had been 767·5, 11·94, and 40·0; and for 1910–14, 544·6, 4·39, and 20·7. The high admission ratio is attributed to continued disturbance on the North-West Frontier, followed by concentration of troops in that area during the malarial season; return of troops from Mesopotamia and Egypt, with resulting increased venereal incidence; also influenza and respiratory diseases. The highest admission ratios were for malaria (206·5), venereal disease (60·5), and influenza (25·3 per 1000); the most fatal diseases were lobar pneumonia (2·49) and influenza (1·43). Two stations on the North-West Frontier (Sora Rogha and Darasmand) showed the very high admission ratios of 1843 and 1722·5 per 1000 respectively, the death ratios being 19·28 and 9·34; at Loralai the admissions were 1110·3 and the deaths 24·23 per 1000, this latter ratio being higher than in any other large garrison in India, though considerably less than the death-roll (78·39) at the same station in 1919.

*Influenza, Cholera, Enteric Fevers.*

For India as a whole there was a decrease in influenza (25·3 admissions and 1·43 deaths per 1000), as compared with the corresponding ratios (34·7 and 2·63) in 1919; but at Bombay the admissions were as many as 356·6, and the deaths 9·82 per 1000; at Maymyo these ratios were 246·6 and 12·82, and at Loralai 54·1 and 12·89 respectively; at this last-mentioned station there were two periods of prevalence; from January to August there were 66 cases, with a fatality of 15·15 per cent.; in November and December 39 cases, with a fatality of 38·46 per cent. There were only 15 admissions for cholera (0·1 per 1000), with 5 deaths (0·02), compared with 134 and 77 (0·6 and 0·34) in 1919; 8 of the cases and 4 deaths occurred at Lucknow in August and September; the source of infection was not discovered. For small-pox there were 144 admissions and 14 deaths (0·6 and 0·06 per 1000). In regard to the "enteric group of fevers" the same confusion of terms (continued from the previous year's report) occurs as has been already referred to in regard to British troops. For the *whole* group, which might be called "enterica," there were 129 admissions and 31 deaths (0·6 and 0·14 per 1000), some increase on the ratios of the preceding year (0·4 and 0·06), but a great improvement on the quinquennial averages (1915–19) of 1·2 and 0·28. For typhoid fever the admissions and deaths were 17 and 3; for the "enteric group," 104 and 28; and for paratyphoid A, 8 admissions with no death; there was no epidemic prevalence at any station. Throughout the army inoculation is systematically carried out.

*Malaria and other Fevers.*

There was an increase in malaria prevalence (206·5 admissions per 1000, compared with 145·6 in 1919), but the mortality was less (0·46 compared with 0·54); the increase is attributed chiefly to concentration of troops in very malarious districts (Waziristan) on the North-West Frontier, and was unavoidable under the circumstances. For plague there were only 29 admissions (0·1 per 1000), with 17 deaths (0·08 per 1000); 15 of the cases occurred at Jhelum and 10 at Bangalore. At Jhelum the disease originated in Cureton Lines, which were rat-infested, and have since been demolished; at Bangalore the cases were distributed throughout the station, due to the rats migrating from the native bazars, where plague was prevalent throughout the year. The incidence of pulmonary tuberculosis (4·3

admissions and 1·08 deaths per 1000) was about the same as in 1919 (4·0 and 1·08), but remains considerably higher than in recent years; in 1916, 1917, and 1918 the ratios for admission to hospital had been 2·8, 2·9, and 2·5; and for death, 0·42, 0·63, and 0·63 respectively. Three stations showed relatively very high incidence: Lansdowne (14·6), Ahmednagar (14·0), and Agra (10·5 per 1000). The Gurkha admissions and deaths were 6·0 and 2·68; excluding Gurkhas the ratios were 4·1 and 0·89. Lobar pneumonia, on the other hand, was not so frequent nor so fatal as in the years immediately preceding; the admissions and deaths were 11·7 and 2·49 per 1000, higher than the corresponding ratios in the pre-war quinquennium (7·7 and 1·05), but a considerable improvement on those for 1915–19 (17·3 and 4·36), which, however, included the influenza epidemic of 1918, when the ratios were 19·6 and 6·02. For all other diseases affecting the respiratory system the admission and death ratios were 53·6 and 1·54 per 1000, compared with 56·8 and 1·31 in 1919. The group of diarrhœal diseases (dysentery, colitis, and diarrhœa) with 49·1 admissions and 0·18 deaths per 1000, showed an improvement on the figures for 1919 (65·9 and 0·30), and on those for the quinquennium (54·6 and 0·41 per 1000); Meiktila suffered from dysentery (167·4 per 1000), and Fort Sandeman and Darasmand from colitis (105·5 and 102·7 per 1000). At 57 stations a total of 1221 cases were examined as to the type of dysentery; 530 were found to be protozoal in origin (43·4 per cent.), and 26 bacillary, the remainder being diagnosed on clinical grounds.

*Venereal Disease.*

With regard to venereal disease in the native army the position is much the same as that already adverted to in connexion with European troops. In the pre-war quinquennium, 1910–14, the venereal incidence in the former was 14·8 admissions per 1000, 4·4 per 1000 being due to syphilis. For the five years, 1915–19, the corresponding ratios averaged 49·9 and 7·9; in 1920 the total admissions rose to 70·5 per 1000, of which 14·7 per 1000 were for syphilis. Although this total venereal disease admission ratio is not nearly so high as that for European troops (118·2), the relative increase is much greater, being nearly 400 per cent. as compared with the incidence in the quinquennium, 1910–14. The variation in the relative prevalence in different parts of India has already been referred to. The causes of the high admission ratio are stated to be (1) change in the type of man and loss of continuity of regimental control and regimental life; (2) inclusion in the combatant statistics of large numbers of men of a lower grade socially, morally, and intellectually than the pre-war sepoy; and (3) the large number of men who contracted disease on furlough.

III. HEALTH OF GENERAL POPULATION.

In regard to the general population of the country the conditions were on the whole favourable; the rainfall was somewhat in defect, but not enough to cause serious diminution in the autumn crops. The agricultural classes "are everywhere living in greater comfort than before." The birth-rate (32·98 per 1000) was lower than the quinquennial mean (35·97), the country not having yet recovered from the influenza visitation of 1918. All provinces show a decrease, except the Punjab, where the ratio (42·9 per 1000) was the same, and Upper Burma (37·95 compared with 35·77). The recently constituted province of Delhi registered the highest ratio (47·36); next to this comes the Punjab, with 42·9. The lowest ratios were returned in Madras Presidency (28·4), Ajmer-Merwara (27·77), and Coorg (23·81).

*Infant Mortality and the Native Midwife.*

The important question of infantile mortality is dealt with at length; the ratios of deaths under 1 year of age to live births varied from 161 per 1000 in Madras Presidency, 162 in the North-West Frontier Province, and 170 in Bihar and Orissa, to 303 in Rangoon, 386 in Calcutta, and 556 in Bombay city; if calculated on the estimated number of births instead of those actually registered, this last ratio (Bombay city) would be 404 per 1000. (The infantile mortality in 1920 for England and Wales was 80, and for London 75, per 1000 births.) The highest ratios in Bombay were registered in the market section (995·6) and Mandvi (900·5 per 1000), and the lowest in Fort South (250·0). Poverty of the bulk of the population, early marriage, and general lack of sanitation in the homes of the people, combine to produce the regrettable result; 32·74 per cent. of these deaths occurred in infants under 1 month old. Of the total births registered (19,731) in Bombay city, 14,956 took place in single-room tenements, with a mortality of 631·1 per 1000. "The vast majority of women in India are attended in their confinement by indigenous midwives, known as *dais*. Their midwifery practice follows custom and tradition, which unfortunately are not based on real training or knowledge.... They are ignorant of the natural course of labour, and their one aim in practice is to accelerate delivery, quite regardless of the actual state to which labour has advanced. They are of the lowest caste and of uncleanly habits." Much has been done to combat this state of affairs, and in many of the large cities progress has been made. "An exhibition in maternity and child welfare was held at Delhi in February, which was successful beyond all expectations, and subsequently similar exhibitions were arranged in Calcutta, Bombay, and elsewhere. Lady Chelmsford founded the All-India League for Maternity and Child Welfare, which "is intended to take its place as a central agency collecting information regarding progress in the movement from many centres both in India and other countries, and disseminating the same by every means in its power to those associations affiliated to it."

*Plague and the Black Rat.*

The total mortality for the civil population throughout British India in 1920 amounted to 7,355,654, showing a decrease of 1,198,524 on that of the year preceding; the ratio was 30·84 per 1000, compared with 35·87 in 1919, and 38·02, the quinquennial mean. There was an increase in plague, which caused 99,368 deaths, against 74,284 in 1919 (0·42 per 1000 compared with 0·31). A valuable memorandum, summarising the experience gained in organising preventive measures, was drawn up by Government, and is reprinted in this report; the conclusion is that—

"While the palliatives hitherto adopted—hospital treatment, evacuation of stricken areas, and anti-plague vaccination—must be sedulously maintained and the facilities for extending them increased, it has to be recognised that these are mere palliatives, that the initial responsibility for the outbreak and spread of bubonic plague rests on the black rat, and that the destruction or segregation of this animal is the obvious and only method which will exterminate bubonic plague. Since any measures which involve construction of buildings and considerable outlay must necessarily take time, it is necessary in the meantime to depend on rat destruction carried out continuously in large grain-distributing centres, and as required in villages and towns. But the erection of rat-proof or rat-free grain stores, resulting in the diminution of the rat population, is a method just as effective and free from the objections which might possibly be held to attach to rat destruction.... Finally, the ultimate goal of better housing and improved sanitary conditions will, the Government of India are assured, be kept steadily in mind.... It is for the local governments to initiate a progressive policy, and attack the disease at its sources, rather than wait for renewals of its onset."

At the Poona Plague Laboratory it was found that the most satisfactory rat poison is "barium carbonate, which should be 80 per cent. pure, and free from repellents"; baits made up with the grain *bajra* are the most attractive; the tainting of traps by the human hand reduces efficiency by 21 per cent.; the "Zip" and "Wonder" traps are recommended. Major F. W. Cragg has proved that there are three species of rat flea: *Xenopsylla cheopis*, *X. astia*, and *X. brasiliensis*; only *X. cheopis* appears to be an efficient transmitter of plague.

*Cholera.*

The cholera mortality showed an immense improvement as compared with 1919; the deaths numbered 130,140 (0·55 per 1000), compared with 578,426 (2·43 per 1000) in the previous year. In Bengal the ratio was 1·2, but in no other province did it exceed 0·4, except in Madras (0·8), Bihar and Orissa (0·7), and Lower Burma (0·43). In 1919 Madras Presidency had the relatively high ratio of 2·3, and in the year under consideration more than half the deaths occurred in the first quarter; local authorities are apt "to await until an outbreak reaches serious proportions before taking steps to combat it." In Orissa a large Imperial grant of three lakhs of rupees was allotted, and earmarked, for expenditure on water-supply at Puri, the great Juggernaut pilgrimage centre; but no progress appears to have been made in this very necessary work. The United Provinces are said to have been "singularly free from cholera"; there were 6952 deaths (0·15 per 1000), compared with 81,365 deaths (1·74) in 1919. In the Punjab the mortality (0·01) was lower than in any year since 1899; the total deaths numbered 138; 63 cases were "directly due to importation from the Hardwar fair. ... The religious tenets and observances of the devout Hindus include bathing in and drinking the waters of certain sacred rivers, streams, and tanks. ... In early India no doubt the wide river Ganges was a far better drinking water-supply than the water of wells and ponds. Even now it has marvellous powers of self-purification, but the growth of big towns along its banks, the pollution by crowded city populations, and trade effluents have ruined its purity." This is a real difficulty from the public health standpoint, and it does not appear that any practicable remedy exists at the present time. In Bombay Presidency the cholera mortality was only 0·10, compared with 2·63 in 1919, and in the Punjab only 0·01, compared with 0·44. The Public Health Commissioner draws attention to the extraordinary fluctuations in cholera during a series of years, as shown in a valuable table giving the figures from 1889 to 1920. The most striking instance is that of the Central Provinces, where there were 57,131 cholera deaths in 1897, and only *seven* in 1898. During the year under

report there were only two cholera deaths in the North-West Frontier Province; in 1919 there had been 4400. This and other examples "prove that residual infection is not a prominent feature." The migration factor of the large numbers of pilgrims and labourers to and from fair centres and labour areas is of prime importance.

*Small-pox and Vaccination.*

The deaths from small-pox totalled 101,329, of which 79,753 occurred in the first six months of the year; the ratio was 0·42 per 1000, compared with 0·57 in the previous year, and 0·37 in the quinquennium (1915–19). In towns the death-rate was 0·59, in the rural districts 0·41 per 1000. The high mortality (1 per 1000) in the North-West Frontier Province was, no doubt, due to the exceptional conditions obtaining in that area; 1185 out of the 2051 deaths occurred in the Dera Ismail Khan district. The death-rate in Bengal (0·8) is to be compared with that in Bombay Presidency (0·18), the actual deaths numbering 36,190 and 3536 respectively. In Bihar and Orissa and in the Central Provinces it is stated that political agitators and "non-coöperators" adopt the rôle of antivaccinators, and teach the people to refuse vaccination, and harass the staff by refusal of supplies and lodging. In Bombay Presidency 650 cases of small-pox were examined as to their condition as regards vaccination; 263 had been vaccinated, of whom 15 died (5·70 per cent., most inexcusably misprinted 57); 387 were unvaccinated, of whom 66 died (17·05 per cent.). It is not stated whether evidence of vaccination was satisfactory.

In the section dealing with vaccination, it is to be regretted that the record shows a considerable decrease in the number of operations performed; in 1919–20 there were 7,810,909 primary and 3,059,537 revaccinations; in 1920–21 the corresponding figures were 7,582,710 and 2,041,525. The success percentages were 94·36 and 67·48 respectively in the former year, and 91·69 and 68·56 in 1920–21. The total operations showed a decrease of 1,246,211, or 11·5 per cent.; the decrease occurred in all provinces except Bihar and Orissa, Delhi, and Ajmer-Merwara, being generally attributable to less prevalence of small-pox, and the non-coöperation movement. The success rate of primary operations (87 per cent. or upwards) was satisfactory in all provinces except Madras, where the ratio was only 57·3 per cent.; for revaccinations the success rate was above 70 per cent. in Bengal, Bihar and Orissa, Delhi and the North-West Frontier Province; in Madras it was only 35·2, and in Bombay 20·53 per cent. There appears to be some doubt as to the accuracy of the returns in Bihar and Orissa, as "the total number of operations performed is constantly in excess of the total number of infants available, which shows that the returns are fictitious to that extent. Mortality from small-pox is stated to be constantly increasing, which is considered to be a complete demonstration both of insufficiency and inefficiency of the existing arrangements for vaccination. There is accordingly a great necessity for a more definite vaccination policy."

The "non-coöperation movement" is considered to have been partly answerable for the decrease in the United Provinces, Punjab, and the Central Provinces.

*Fevers.*

Under the heading of "Fevers" it has been not unusual to register all deaths, the cause of which has not been obvious; "most statistical workers in India accept as a rough estimate one-quarter to one-third of the deaths registered under the 'fever' heading as directly or indirectly due to malaria." It has now been decided to add a supplementary form, dividing the main heading into six subheads—viz., malaria, enteric, measles, relapsing, kala-azar, and "other fevers." This will be welcomed as distinctly enhancing the value and interest of these reports. In the United Provinces, of the total "fever" deaths (1,442,376) malarial fevers are credited with 1,010,614; enteric, 68,593; measles, 20,116; relapsing, 5243; kala-azar, 4666; and "other fevers," 333,144. This last heading (the Sanitary Commissioner conjectures) "includes the majority of kala-azar, enteric, and relapsing fever." In Bombay Presidency, of the total 266,092 "fever deaths," only 33,904 are ascribed to malaria, 2536 to enteric, 2771 to measles, 48 to relapsing fever, and 2 to kala-azar; the remaining 226,831 being "unclassified." The enhanced price of quinine (which has risen from Rs.17 to Rs.55 per pound in seven years) has seriously affected the "quinine sale" policy in all provinces. The Government are attending to the matter, and at Tavoy, in Lower Burma, planting operations are being successfully carried on under Lieut.-Colonel A. T. Gage, I.M.S., who is of opinion that the output can be increased up to a million pounds of quinine alkaloids yearly. Kala-azar "may be said to have its permanent home in Assam"; Nowgong, Goalpara, and Kamrup were the districts most affected; Cachar and Lakhimpur remained free. There was a great increase in the number of infected villages, and an attempt at quarantine was not a success. Treatment by antimony tartrate gave very good results and is growing in popularity. The magnitude of medical inspection work in the ports of India may be inferred from the mere numbers of outward and inward bound vessels examined; there were 1066 at Bombay (not including military troopships), 1466 at Rangoon, and 1930 at Calcutta; the persons examined totalled 237,219 (not including troops) at Bombay, and 288,152 at Calcutta. The total number of persons inspected at Rangoon is not stated; 1070 vessels out of 1221 that arrived at the port were visited; 35 cases of cholera and 32 of small-pox were found, also 5 small-pox cases and 14 lepers were detected in outgoing ships.

In Calcutta city there was a mild recrudescence of plague, causing 53 deaths, and cholera was present throughout the year, causing 2302 deaths, Hindus (with 3·3 deaths per 1000) suffering more than Mohammedans (1·1), or non-Asiatics and Anglo-Indians (0·36); small-pox caused 2925 deaths, but a record was reached in revaccinations (200,000). At Karachi 4081 persons embarked for the Mecca pilgrimage, and 3605 returned; none of the ships had any cases of infectious disease on either the outward or homeward voyage. At Madras 773 vessels and 223,085 crew and passengers were inspected; one case of small-pox and two of cholera were found. This bald statement of figures is a record of work of the very highest importance, carried out under pressure with much skill and energy.

## A PERMANENT ARMY HYGIENE SCHOOL.

THE establishment of this school at Aldershot will be welcomed by those who realise the importance of consolidating the lessons learnt during the war in military hygiene. Even in peace time it is important that every company shall have an officer who thoroughly understands why there must be no flies and how this end is to be achieved, why the latrines must not smell, and how a destructor can be most quickly established. Such things this hygiene school will teach, and hospitals will be relieved of the care of those whose illness is preventable by simple means.

## THE OUTSIDE OF THE TIN.

IN the leading article entitled "Botulism," published in THE LANCET of Sept. 2nd, a reference was made to the physical alteration of the outside of the tin which usually—though not always—accompanies the process of putrefaction of its contents. The canning of foods and the processes of soldering were thoroughly dealt with in our columns as long ago as 1899 in an article[1] by Dr. F. W. Alexander, medical officer of health for Poplar, who quoted extensively from the findings of Dr. J. Brown, medical officer of health at Bacup, in this connexion. From his large experience in following legal proceedings relating to defective canned foods, Dr. Alexander brought to light several interesting facts—e.g., that the "blow-hole" is not really necessary, but that firms supplying canned food make the hole during the first or low-heat stages of the bathing and steaming processes to allow air to escape, so that when the cooking and sterilising are complete, and the cans have cooled down, the ends of the can become concave. This is done, Dr. Alexander was assured, to satisfy the public who like to see concave ends when purchasing. Dr. Alexander continued:

"The question of how long foods hermetically sealed will keep was raised during the hearing of the summonses, and whether the heat of a shop would not affect the contents of a can. Dr. Brown in his article states: 'Fortunately, having had canned foods, including meats, soups, rabbits, oysters, &c., of from 20 to 30 years old, I found that the tins, though rusty outside, were perfectly good inside; none were blown.' One of the experts for the prosecution told me that his firm had now canned meat quite good which had been through the Crimean War. An expert stated in evidence that one plan adopted by his firm to test whether the sterilising process had been properly carried out and whether the contents of cans were good before sending them out was to place them in a heated room or chamber in order to see if the cans became blown."

Dr. Alexander went on to suggest that no can should have more than one soldering-point, and that this point should be either at the top or the bottom of the can, in such a position that it is not liable to be covered by a label; before the can leaves the factory a metallic plate with the name of the firm and the date of sending out should be soldered over the soldering-point. Imported canned foods should have the names of the importers printed on the label, and such persons should be made answerable for the same requirements.

THE National Council for the Promotion of Race Renewal is organising an international congress for the Re-affirmation of the World's Moral Ideal, to be held in London from Oct. 15th–22nd. Dr. Mary Scharlieb will preside at a discussion on Marriage and Parenthood, in which among others Dr. J. W. Ballantyne, Mr. C. J. Bond, and Dr. H. Crichton Miller will take part.

[1] THE LANCET, 1899, i., 1316.